UNDERSTANDING THE ORGANIC CHAIN

THE FRAMEWORK OF THE INTERACTION BETWEEN ACTORS IN ORGANIC CHAINS IN RELATION TO THE ECOLOGICAL MODERNISATION OF FOOD PRODUCTION

DOCTORAL THESIS
Marja-Riitta Kottila

ACADEMIC DISSERTATION

To be presented, with the permission of the Faculty of Agriculture and Forestry of the University of Helsinki, for public examination in lecture room B2, Latokartanonkaari 7–9, Viikki on 27 August 2010 at 12 noon.

Helsinki 2010

DEPARTMENT OF AGRICULTURAL SCIENCES I PUBLICATIONS I 3

Supervisors: Professor Juha Helenius
University of Helsinki
Department of Agricultural Sciences/Agroecology
FI-00014 Helsinki, Finland

Professor Saara Hyvönen
University of Helsinki
Department of Economics and Management
FI-00014 Helsinki, Finland

Reviewers: Professor Niels Heine Kristensen
Aalborg University
Department of Development and Planning
Lautrupvang 2, Building: B Room,
DK - 2750 Ballerup, Denmark

Research Professor Eva Heiskanen
National Consumer Research Centre
P.O.Box 5, (Kaikukatu 3),
FI-00531 Helsinki, Finland

Opponent: Professor Hanna-Leena Pesonen
University of Jyväskylä
School of Business and Economics
P.O.Box 35 (Agora),
FI-40014 University of Jyväskylä, Finland

Cover photographs by the courtesy of European Commission, EkoCentria, Meeri Komulainen

ISBN 978-952-10-4303-1 (paperback)
ISBN 978-952-10-4304-8 (PDF)
ISSN 1798-7407 (paperback)
ISSN 1798-744X (PDF)
ISSN-L 1798-7407
Electronic publication at http://ethesis.helsinki.fi

Helsinki University Print
Helsinki 2010

PREFACE

This thesis originated in real-life problems. During my eight years working at Finfood luomu, when I provided information on organic food and promoted its consumption I repeatedly observed the imbalance between the demand for organic products and their supply. A number questions arose concerning the operation and performance of organic chains and they called for answers.

Research Program for Organic Food and Farming in Finland launched by Finland's Ministry of Agriculture and Forestry in 2003 provided an opportunity to relinquish my daily duties and take part in a project called 'Interaction between the actors of the organic demand-supply chain' which was established in 2004 to answer these questions.

However, this was only the starting point for the long and exciting process of writing this thesis. The practical questions are not limited to the boundaries of a given scientific field. These questions led me to search literature of various fields and ultimately integrate the knowledge gleaned from different perspectives. Furthermore, the scientific world and its society was a new challenge for me after twenty years work experience between the Master's degree and the start of this new phase of studies. Writing this thesis has been an enormous learning process. In addition to the knowledge I acquired from several fields along with learning methodology and scientific writing I also learned perseverance, what attitude to take towards critics and how to find my way in situations where I felt totally lost.

Even after a long run with many ups and downs, I am happy I took on this challenge. Although many of the original questions remain unanswered, my understanding of organic chains has increased significantly. I hope this thesis will disseminate this understanding and thus contribute in its own small way to the development of the organic food sector.

Kuiviniemi, 5 June 2010
Marja-Riitta Kottila

LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following original articles, which are referred to in the text by Roman numerals.

I Kottila, M-R. Coherency among the actors in two hybrid organic chains in Finland. *International journal on food system dynamics*. Submitted manuscript.

II Kottila, M-R. and Rönni, P. 2008. Collaboration and trust in two organic food chains. *British food journal* 110, 4/5: 376-394.

III Kottila, M-R. and Rönni, P. 2010. Communication between actors of food chains: Case studies of two organic food chains in Finland. In Lindgreen, A. and Hingley, M. (eds.) *Market Oriented? The metamorphosis of food and agricultural production and marketing:*171-186, Surrey, Gower Publishing.

IV Kottila, M-R. 2009. Knowledge sharing in organic food supply chains. *Journal on chain and network science* 9, 2: 133-144.

CONTRIBUTIONS

	I	II	III	IV
Initial idea	M-RK	M-RK, PR	M-RK	M-RK
Logic of reasoning	M-RK	M-RK, PR,	PR, M-RK	M-RK
Material	M-RK	M-RK	PR, M-RK	M-RK
Analyses	M-RK	M-RK, PR	M-RK, PR	M-RK
Manuscript	M-RK	M-RK	M-RK	M-RK

M-RK = Marja-Riitta Kottila, PR= Päivi Rönni

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ABSTRACT

The sustainability of food production has increasingly attracted the attention of consumers, farmers, food and retailing companies, and politicians. One manifestation of such attention is the growing interest in organic foods. Organic agriculture has the potential to enhance the ecological modernisation of food production by implementing the organic method as a preventative innovation that simultaneously produces environmental and economic benefits. However, in addition to the challenges to organic farming, the small market share of organic products in many countries today and Finland in particular risks undermining the achievement of such benefits.

The problems identified as hindrances to the increased consumption of organic food are the poor availability, limited variety and high prices of organic products, the complicated buying decisions and the difficulties in delivering the intangible value of organic foods. Small volumes and sporadic markets, high costs, lack of market information, as well as poor supply reliability are obstacles to increasing the volume of organic production and processing. These problems shift the focus from a single actor to the entire supply chain and require solutions that involve more interaction among the actors within the organic chain.

As an entity, the organic food chain has received very little scholarly attention. Researchers have mainly approached the organic chain from the perspective of a single actor, or they have described its structure rather than the interaction between the actors. Consequently, interaction among the primary actors in organic chains, i.e. farmers, manufacturers, retailers and consumers, has largely gone unexamined. The purpose of this study is to shed light on the interaction of the primary actors within a whole organic chain in relation to the ecological modernisation of food production. This information is organised into a conceptual framework to help illuminate this complex field.

This thesis integrates the theories and concepts of three approaches: food system studies, supply chain management and ecological modernisation. Through a case study, a conceptual system framework will be developed and applied to a real life-situation. The thesis is supported by research published in four articles. All examine the same organic chains through case studies, but each approaches the problem from a different, complementary perspective. The findings indicated that regardless of the coherent values emphasising responsibility, the organic chains were loosely integrated to operate as a system. The focus was on product flow, leaving other aspects of value creation largely aside. Communication with consumers was rare, and none of the actors had taken a leading role in enhancing the market

for organic products. Such a situation presents unsuitable conditions for ecological modernisation of food production through organic food and calls for contributions from stakeholders other than those directly involved in the product chain.

The findings inspired a revision of the original conceptual framework. The revised framework, 'the three-layer framework', distinguishes the different layers of interaction. By gradually enlarging the chain orientation the different but interrelated layers become visible. A framework is thus provided for further research and for understanding practical implications of the performance of organic food chains. The revised framework provides both an ideal model for organic chains in relation to ecological modernisation and demonstrates a situation consistent with the empirical evidence.

INTRODUCTION

ORGANIC FOOD PRODUCTION AND ITS MARKET

Organic agriculture is defined as 'a holistic production management system which promotes and enhances agro-ecosystems health, including biodiversity, biological cycles and soil biological activity' (FAO/WHO Codex Alimentarius Guidelines: 2). The International Federation of Organic Agriculture Movements (IFOAM) defines organic agriculture as 'a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved' (IFOAM). In the European Union (EU) organic regulation organic agriculture is defined as follows: 'Organic production is an overall system of farm management and food production that combines best environmental practices, a high level of biodiversity, the preservation of natural resources, the application of high animal welfare standards and a production method in line with the preference of certain consumers for products produced using natural substances and processes' ((EC) No 834/2007: L 189/1).

In practise, these aims and principles are implemented by standards that regulate the methods used in organic farming and in processing organic products. The IFOAM basic standards provide a framework for certification standards applied in various regions (IFOAM). The European Union has approved standards for organic agriculture since 1993 ((EEC) No. 2092/91), a standard that has recently been replaced by the new Council Regulation ((EC) No. 834/2007) and is complemented by European Commission regulations ((EC) No. 889/2008, (EC) No.1235/2008). An essential component of the organic standards is an inspection and certification system that includes organic labelling.

Currently, 32.2 million hectares globally are certified to meet organic standards, including areas that are both fully converted and in the process of conversion. The largest share of organic agricultural area is in Oceania/Australia (38%), followed by Europe (24%) and Latin America (20%) (Figure 1). Australia has the largest organic agricultural area (12.02 million ha) in the world. In Europe, the countries with the largest organic areas are Italy (1.15 million ha) and Spain (0.99 million ha). In terms of certified organic area as a proportion of national agricultural area, Liechtenstein (29%), Austria (13.4%) and Switzerland (11%) top the list in Europe (as of the end of 2007). (Willer, 2009a; Willer, 2009b)

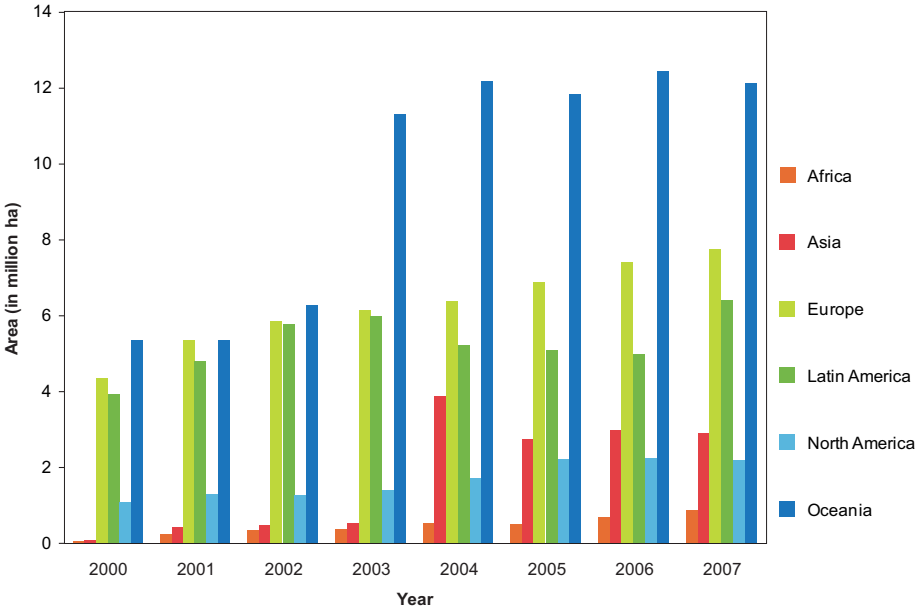

Figure 1. Development of total organic agricultural area by geographic region, 2000–2007. (Data: FiBL and IFOAM 2009).

In Finland organic production spread slowly until the country became a member of the EU at the beginning of 1995. The boost to organic farming lasted several years. As of 2007, the organic agricultural area in Finland covered 148,760 ha, or 6.5% of the total country's agricultural area (Figure 2).

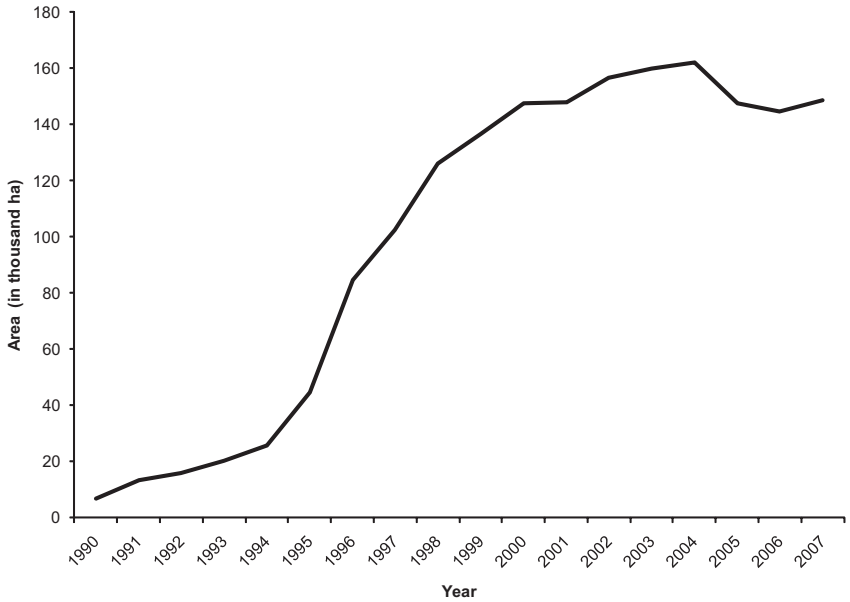

Figure 2. Development of organic agricultural area in Finland (Data: Evira).

In 2007 the global market for organic products had reached a value of 46.1 billion US dollars. The vast majority of organic products are consumed in North America and Europe, which together comprise 97 per cent of the global revenue. (Sahota, 2009) In the year 2007, sales of organic products in Europe amounted to approximately 16 billion Euros, the largest market being in Germany. Measured in terms of the organic share of total food sales, the leading countries for organic sales in Europe are Denmark (6.0%), Austria (5.3%), Switzerland (4.6%) and Sweden (4.3%) (Padel et al., 2009). In 2007 growth was reported in all European countries in 2007 (Padel et al., 2008; Padel et al., 2009). In Finland, organic sales have developed quite slowly. In 2006, retail sales of organic products were around 60 million Euros, which accounted for 0.8% of the total market (Heinonen, 2007).

General food stores are the leading channels of distribution of organic foods, although the role of alternative channels varies in different countries[1]. In the Nordic countries, the general retailers sell 80 per cent and more of the organic products (Schaer, 2009). Supermarkets provide easy access to organic products and are regarded as key for the growth of the organic market (Hamm and Gronefeld, 2004). However, consumers in many European countries connect supermarkets with industrialised food systems and hence perceive them to be an unsuitable marketing channel for organic products (Bähr et al., 2004).

THE AIM OF THE RESEARCH

Increasingly, organic food has gained attention from consumers, farmers, food and retailing companies, and politicians. Consumer surveys have demonstrated the strong trend in organic products for several years and for various reasons, such as health, food safety, environmental protection, animal welfare and taste (Bähr et al., 2004; Tarkiainen and Sundqvist, 2005; Sarkkinen et al., 2006; Lea and Worsley, 2005; Wier and Calverley, 2002). However, the market share of organic products has remained quite small in many countries, particularly in Finland.

The problems identified as hindrances to the increased consumption of organic food are poor availability, limited variety and high prices or the poor quality-to-price ratio of organic products (Bähr et al., 2004; Padel and Foster, 2005; Sarkkinen et al., 2006). Furthermore, complicated buying decisions partly explain the gap between consumers' attitudes to organic products and their buying behaviour (Padel and Foster, 2005; for more about the gap between environmental awareness and pro-environmental behaviour, see Kollmuss and Agyeman, 2002). The complexity stems

1 General food shops include those selling predominantly conventional foods, small food shops, supermarkets, hypermarkets and discounters (see Hamm et al., 2004, p. 52).

from competing and conflicting discourses about consumer motivations, competing desires, needs and preferences together with the availability of a wide range of products with competing and sometimes conflicting marketing messages (Lockie et al., 2002). In addition, the intangible value of organic products, based at least partially on different production methods, is difficult to deliver through traditional marketing methods (Guptill and Wilkins, 2002; Zanoli et al., 2004).

The small volume and the sporadic market for organic products make processing and marketing inefficient. Baecke et al. (2002) described the imbalance between supply and demand as a story of the chicken and the egg: To achieve cost-efficiency, sufficient supply and demand is needed, but farmers expect an efficient organic supply chain to exist before they convert to organic production. Van der Ploeg et al. (1999) used the word 'waiting' to refer to the situation in which the pursuit of efficiency locked the actors into food networks and excluded the potential to move or make changes. Furthermore, the lack of market information and poor supply reliability have been identified as obstacles to increasing the volume of organic production and processing (Franks, 2003; Hamm and Gronefeld, 2004). These problems, both on the demand side and on the supply side of the organic chain, are also encountered in Finland (Finfood, 2004a, b; Sarkkinen et al. 2006). This situation shifts the focus from a single actor to an entire supply chain and demands solutions that involve more interaction among the actors within the chain.

Organic food chains as entities comprised of multiple actors with ongoing relationships have received little scholarly attention. With few exceptions, researchers have approached organic chains from the perspective of one actor or actor group, mainly, that of consumers (Bähr et al., 2004; Padel and Foster, 2005) and organic farmers/processors (van der Ploeg et al., 1999; Baecke et al., 2002). For example, studies in Finland have revealed consumer motivations for buying organic food (Tarkiainen and Sundqvist, 2005) and farmers' reasons for converting to organic production (Kallio, 1998). Although consumers and organic farmers are irreplaceable actors in organic food chains, the recent development of the organic market suggests the important contribution of retailers. However, the interaction among the primary actors, i.e. the farmers, manufacturers, retailers and consumers, has gone largely unexamined. Ilbery and Maye (2005a, 2006) have approached alternative, local food chains both from the farmers' and the retailers' perspectives. The authors demonstrated that the economic imperative often leads farmers or manufacturers to rely on several marketing channels, which in turn leads to hybrid forms of organic chains, i.e. those comprised of actors with varying shares of organic production. Wycherley (2002) studied the relationship between organic and conventional actors and emphasised organic suppliers' scepticism of conventional actors. To overcome this scepticism, he suggested that the conventional actors ought to adopt a reflective way to manage relationships with the organic suppliers, while organic suppliers should improve their exchange competence. Although these studies discussed the

conditions of each chain, they did not examine the consumers' role or focus on the chain as an entity consisting of interacting stakeholders.

The purpose of this study is to examine the interaction of the primary actors within an organic chain in relation to the ecological modernisation of food production. Furthermore, the goal is to provide a conceptual framework for understanding this interaction. The following questions are addressed:

1. How do the actors interact in a hybrid organic food chain?
2. Does this interaction enhance the ecological modernisation of food production?

Milanez and Bührs (2007:573) defined ecological modernisation as 'the implementation of preventative innovation in production systems (processes and products) that simultaneously produces environmental and economic benefits'. I regard the organic method as a preventative innovation in farming systems with the potential to enhance ecological modernisation (see Michelsen, 2008). The literature provides conflicting views on the ecological benefits of organic food production, depending on the crop, the soil and weather conditions and on which dimensions of ecological benefits are examined. Studies show the ecological benefits of organic farming when measured per unit of area, but the benefits are less pronounced when assessed per unit of production due to lower land use efficiency. (Pimentel et al., 2005; Jensen, 2009; Gröönroos and Seppälä, 2000; Mondelaers et al., 2009). However, given the huge variation, the problems in assessing the ecological benefits and the dynamic nature of organic farming methods, I use the definitions of organic agriculture that strongly emphasise the goal of sustaining ecosystem health, and I assume that the increase in consumption followed by the increase in organic production entails ecological benefits. In this thesis interaction in this thesis is approached through communication in the relationships among the primary actors.

The thesis is organised as follows. The next chapter discusses the theoretical and methodological approaches that I regard as relevant to the aim of the study and integrates these approaches into a conceptual framework. Thereafter, I briefly present the articles that support the thesis. The chapter 'Methodology' describes the study design, the data and the methods that were used to ascertain the findings described in the articles. The results are summarised and discussed in the chapter 'Findings'. Thereafter, I revise the conceptual framework in light of the findings and discuss it in relation to the study's aim and previous research. Finally, the practical implications are considered, and topics for future research are suggested.

THEORETICAL AND METHODOLOGICAL APPROACHES TO ORGANIC CHAINS

This section discusses the following three areas that I regard as exceptionally relevant to understanding organic chains: food systems, ecological modernisation and supply chain management. I first present each of these and then summarise their relationship to this study with the intention of integrating the knowledge about these concepts into a framework for further discussion (Figure 3).

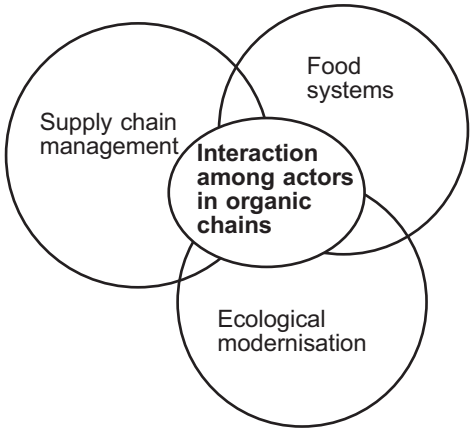

Figure 3. The three relevant approaches.

In this thesis, a supply chain of food products or commodities is used as a synonym for food chains. Thus, an organic chain refers to the supply chain of organic products.

FOOD SYSTEM STUDIES

A food system conceptualises the relationships among the different forces acting upon flows of food commodities, from producers through processing, marketing and distribution to consumers. It incorporates several food chains. (Atkins and Bowler, 2001: 9; Sundqvist et al., 2005)

In more recent food system research, two focus areas can be roughly distinguished: 1) the globalisation of food chains and 2) the quality turn (Mononen, 2006). Studies of the former have shown how progressive industrialisation, meaning a tendency to

replace and substitute natural processes with industrial processes, lengthens food networks, increases food transportation and reshapes the relationships between firms with consequences regarded as disadvantageous to rural residents and the environment (Goodman, 2002; Murdoch, 2000). Various social movements, including an organic movement, have resisted this development (Atkins and Bowler, 2001; Pretty, 2000) by arguing that food does not fit industrialised production because of its close connection to nature. Despite increased human control, food systems are still largely dependent on and conditioned by natural phenomena, both in agriculture and in human nutrition (Fine et al., 1996). Researchers in agro-ecology, for example, have emphasised the diminished variation of ecosystems and species as well as the complicated and even deteriorating management of energy and material flows in a sustainable way. Furthermore, the separation of consumers from the producers of food, both in time and space, creates the risk that consumers cannot recognise when production systems are unhealthy (Sundqvist et al., 2005) (see also Atkins and Bowler, 2001; Fine et al., 1996; Olson and Francis, 1995; Francis et al., 2003).

Consumers' increased interest in 'more natural' or 'more local' types of food is central to the quality turn. Research on the development of rural areas indicates that these dimensions of quality provide the potential for shifting the production of food commodities out of their 'industrial mode' and towards developing supply chains that can increase a portion of the total added value captured by primary producers (Busch and Bain, 2004; Marsden et al., 2000). This line of research focuses on the relationships between food producers and consumers through the following interchangeable notions: 'short supply chains', 'alternative food chains', and 'alternative food networks' (Watts et al., 2005). The emphasis is 'upon the type of relationship between the producer and the consumer in these supply chains, and the role of this relationship in constructing value and meaning, rather than solely the type of the product itself' (Marsden et al., 2000:425). The key is information, which enables the consumer of these products confidently to make connections and associations with the place, methods of production and values of the people involved. The three main types of alternative supply chains are: 1) face-to-face, 2) spatial proximity and 3) spatially extended. While close relationships ensure the information flow in types 1 and 2, in the spatially extended chains, value and meaning-laden information about the place of production and the producers of the food need to be delivered for consumers who are outside the region without face-to-face contacts. (Marsden et al., 2000)

Although the term 'alternative' is used to differentiate the organic chains from conventional food chains, this dichotomy is inconsistent with the evidence. The share of organic products sold by conventional supermarkets as well as the studies identifying the local food chains (Ilbery and Maye 2005a; 2006) demonstrate that the alternative chains are hybrid in nature.

For purposes of this thesis, the studies related to alternative food chains are the ones of greatest interest. They have been conducted against the background of several scientific areas, with geography and rural sociology being foremost. Consequently, these studies have a strong emphasis on rural development (Schmid et al., 2004b; van der Ploeg et al., 1999, Ilbery and Maye, 2006; Midmore et al., 2004). A frequently-used approach to examining alternative food chains is the actor network theory (ANT), developed by Callon and Latour in the 1980s (Callon, 1998). By analysing the growth and extension of spheres and power through 'processes of translation', ANT seeks to understand how the networks gain strength and achieve scope (Schmid et al., 2004a:109). The ANT approach tends to see networks as sets of power relationships (Murdoch, 2000). While ANT has contributed to understanding the ecological impact of globalising food systems by connecting human actors to the natural environment, the central role of non-human actors in the theory has also been criticised (Lockie, 2002).

ECOLOGICAL MODERNISATION

Environmental concerns that can be traced back to the 1960s (Smith, 1992) have recently been included in the broader concept of sustainability. The Brundtland Report defines sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987:8). The often-cited dimensions of sustainability are economic, environmental and social, which more recently have been complemented by a cultural dimension. The focus of discussion and research on sustainability has been on the environmental dimension (Lovio, 2006).

Porter and van der Linde (1995) accelerated business activity in the area of environmental sustainability by emphasising win-win situations between business and the environment. The literature identifies the following strategies for environmental care: a compliance-oriented strategy (i.e. business complies with regulations with the help of end-of-pipe techniques); a process-oriented strategy (i.e. production-integrated measures that achieve both compliance with governmental regulations and better returns); a market-oriented strategy (i.e. designing a benign environmental product to achieve a competitive advantage (Hagelaar and van der Vorst, 2002; see also Orsato, 2006). The term 'green' or 'greening' refers to the adoption of an environmental strategy, modified by the domain, such as green production, green consumerism or green marketing (Burch et al., 2001; Levy, 1997; Peattie and Crane, 2005). Corporate Responsibility (CR) refers to business ethics, whereby companies integrate social and environmental concerns into their business operations and in their interactions with their stakeholders on a volunteer basis. CR consists of

actions that appear to advance some common good beyond the interests of the company and what is required by law (Lovio, 2006; Ness, 1992).

Controversial views have been reported about the performance benefits achieved by companies integrating sustainability or responsibility into their business strategies (Lankoski, 2008b; Peattie and Crane, 2005; Bhaskaran et al., 2006). According to recent research, economic performance is followed by a combination of the following potential results of corporate responsibility activities: learning, reputation and corporate responsibility outcomes. Learning and reputation may indirectly result in economic performance, while corporate responsibility outcomes refer to direct potential economic benefits through increased sales or reduced costs. The relationship between economic performance and CR activities is dynamic and case-specific. (Lankoski, 2008a)

The concept of ecological modernisation (EM) which is closely related to sustainable development, emerged in the early 1980s and is often traced to German sociologist Joseph Huber (1985). Mol (1995:40-48) identified the following issues and actors as characteristic of EM: the involvement of modern science and technology, market actors as important drivers and a state guiding the direction of a development that is supported by citizens and non-governmental actors (NGOs). EM has been interpreted and applied in several ways and in several research areas (Fisher and Freudenburg, 2001). Milanez and Bührs (2007) distinguished the following four strands of EM: the technological, the policy, the social and the economic. The technological strand refers to the redesign of products and processes, resource efficiency and the substitution of raw materials, but also to organisational change, long-term planning, environmental management systems, green marketing and environmental certification. The policy strand focuses on the role of regulatory and voluntary instruments of environmental policy and emphasises a participatory approach and a search for consensus among various stakeholders, including governmental, environmental and industrial organisations. The social strand involves social movements such as NGOs and green consumerism, while the economic perspective measures outcomes. Milanez and Bührs (2007) tried to integrate the main features of these strands by defining EM as 'the implementation of preventative innovation in production systems (processes and products) that simultaneously produces environmental and economic benefits'. In this thesis I have adopted their broad definition. Milanez and Bührs (2007) further identified institutional and situational contexts, categorised according to economic, social and political issues, as conditions for EM (Table 1).

Table 1. Conditions for EM according to Milanez and Bürs (2007).

Category	Institutional contexts	Situational contexts
Economic	State-regulated market	Industrial economy Science and technology infrastructure Well-functioning economy Available financial resources
Social	Sound educational system	High level of environmental awareness High purchasing power
Political	Democratic system Participatory policymaking Environmental institutions	Political stability Government commitment to the environment

Ecological modernisation as well as sustainable development have been criticised for failing to achieve sustainability goals and serving only to improve the image of the companies involved (Allen and Kovach, 2000; Marsden, 2004; Milne et al., 2006; Ulhøi and Madsen, 2009; Burch et al., 2001). According to its critics, EM is too optimistic and the proposed outcomes – ecological benefits paralleled by economic benefits – are not achievable (see Fisher and Freudenburg, 2001). However, as Milanez and Bührs (2007:573) observe: 'fundamental changes are difficult to achieve and take time whereas preventative innovation does not demand structural change and can help to mitigate or reduce environmental impacts in the short and medium term. Even if such gains are modest, they buy time for societies to develop and adopt alternative solutions for environmental problems'.

Much of the criticism of EM stems from different views of the relationship between technology and ecological sustainability. According to the most critical opinions, technological development is generally problematic, and the process of industrialisation should be stopped in order to deal with the ecological crises. By contrast, the proponents of EM believe that environmental problems can best be solved through advancement of technology and industrialisation. (See Fisher and Freudenburg, 2001) These two views are frequently discussed in the context of organic agriculture, using the concepts of system redesign and input substitution paradigms respectively (Lamine and Bellon, 2009; Seppänen, 2004). System redesign refers to the alternative food chains, while input substitution refers to EM. The proponents of the redesign paradigm emphasise the risk of conventionalism. They address the issue of bigger organic farms and increasing marketing territories creating the risk that organic farming will lose its basic principles and its ability to capture the greater share of the total value added to rural residents or at least will damage the image of organic food (Langer et al., 2005; Smith and Marsden, 2004; Vogtmann, 2005).

SUPPLY CHAIN MANAGEMENT

The notion of a supply chain stems from management strategies such as process management, quality management and lean management, introduced above all by the Japanese car industry in the 1980s. (Fearne et al., 2001; Finne and Kokkonen, 2005; Sahin and Robinson, 2002) A supply chain can be defined as 'the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer' (Christopher, 2005:17). The linkages highlight interdependence, a situation in which the actors involved in exchanges are dependent on each other. Supply chains exist whether they are managed or not, but supply chain management (SCM) means that the actors within the chain endeavour to manage the linkages (Mentzer et al., 2001). Lambert et al. (1998:1) state that 'the objective of SCM is to maximize competitiveness and profitability for the company as well as for the whole supply chain network including the end-customer'. Customer value and the resulting profitability can be created by (1) cost reduction (efficiency) and (2) improving customer offerings (effectiveness) (Cooper et al., 1997; Min and Mentzer, 2000; Lambert et al., 1998).

Several definitions of SCM are found in the literature (see Bechtel and Jayaram, 1997; Croom et al., 2000; Giannakis and Croom, 2004; Gibson et al., 2005; Kauffman, 2002; Mentzer et al., 2001; Min et al., 2008). In the early stages of its development, SCM was used to describe the management of inter-organisational material flows, meaning logistics. Several researchers have shed light on the differences between SCM and logistics by emphasising that SCM encompasses all the business processes and shifts the orientation from suppliers to customers (Cooper et al., 1997; Lambert et al., 1998; Mentzer et al., 2001). The Global Supply Chain Forum defined SCM as 'the integration of key business processes from end users through original suppliers that provides products, services and information that add value for customers and other stakeholders' (Lambert et al., 1998:1).

SCM has been of substantial importance since the early 1990s, although the concept was introduced in the early1980s (Svensson, 2003). However, the need was demonstrated much earlier, namely in Forrester's seminal work on the theory of industrial dynamics (Forrester, 1958). Increased uncertainty about the environment, the focus on resources for competitive advantage, the increased understanding of networks and the nature of exchange relationships as well as extended supply chain networks and improvements in information technology are among the drivers of SCM (Fearne et al., 2001; Kauffman, 2002; Mentzer et al., 2001; Sahin and Robinson, 2002; Svensson, 2003). Researchers have even claimed that the idea of competition has shifted from company-against-company to supply chain-against-supply chain (see Christopher, 2005; Giannakis and Croom, 2004). Food and other industries involving fast-moving consumer items apply the SCM-based concept

called Efficient Consumer Response (ECR) (Harris et al., 1999; Hoffman and Mehra, 2000, Alvarado and Kotzab, 2001; Finne and Kokkonen, 2005). The ECR concept emerged in the United States in 1992 and spread rather quickly to Europe, as demonstrated by the establishment of the European ECR-Initiative in 1995 and ECR-Finland in 1996. (Finne and Kokkonen, 2005)

SCM is still evolving, with interest increasing in defining its domain and its theoretical basis (Croom et al., 2000; Giannakis and Croom, 2004; Halldorsson et al., 2007; Hunt and Davis, 2008; Min et al., 2008). Implicitly or explicitly, the concept incorporates ideas from various disciplines, for example, the value chain (Porter, 1985:37), a resource-based view of a firm (Wernerfelt, 1984), market orientation (Narver and Slater, 1990) and networks (Håkansson and Snehota, 1995). Giannakis and Croom (2004) revealed the multidisciplinary nature of SCM by classifying content-oriented research in one of the following three dimensions: synthesis, synergy and synchronisation (Table 2). Recently, sustainability has received attention in building a theory of supply-chain management (Carter and Rogers, 2008).

Table 2. A supply chain paradigm: The theoretical domain of the 3S conceptual framework according to Giannakis and Croom (2004).

Decision dimensions	Research streams	Informant theories
Synthesis	Network analysis	Embeddedness, Governance, Social network theories
	Industrial organisational analysis	Institutional theory, Theory of the firm (Coase theorem), Transaction cost theory, property rights, Value systems
Synergy	Strategic management	Agency theory, Resource-based theory, Portfolio models, Values analysis, Game theory, Fuzzy logic, Contingency theories
	Inter-organisational relationships	(Open) systems theory, Interaction Model, Resource-based theory, Group dynamics, Chaos theory
Synchronisation	Operations management, Logistics, Purchasing	Resource-based theory, Transformation model, Inventory theory
	System engineering	Industrial dynamics

Previous studies have approached SCM from various perspectives, thereby increasing the complexity of this area of research. For purposes of my study, the interaction among the actors, the dimension of synergy and the research stream of inter-organisational relationships are of the greatest interest (Table 2). Because a unified theory of SCM does not exist, I have adopted the view of Halldorsson et al. (2007:284): 'Depending on the concrete situation, one can choose one theory as the dominant explanatory theory, and then complement it with one or several of the other theoretical perspectives'.

DISCUSSION AND INTEGRATION OF THE THREE APPROACHES

Below each research area is discussed in relation to my study, and the different perspectives are summarised in Table 3.

Food system research has revealed ongoing and gradual changes in globalising food systems and the alternative nature of organic chains. There is a strong emphasis on rural actors and short, local chains (see e.g. Beckie et al. 2002; Hindrichs, 2000; Seppänen, 2006; Torjusen et al., 2001; Watts et al., 2005). Local, alternative organic chains entail fundamental changes in the current food systems. Hence, these chains might limit the consumption of organic products with the risk that organic food remains the privilege of a small elite group of consumers (Goodman, 2004). Owing to the limited production, the ecological benefits remain unrealised. Where spatially extended chains are concerned, the existing studies describe their structure rather than increase the understanding of how they function as a chain. Furthermore, the interaction in the networks is mainly approached from the perspective of rural development. (See e.g. Banks and Bristow, 1999; Marsden et al., 2000; Schmid et al., 2004b; van der Ploeg et al.,1999; Ilbery and Maye, 2006; Midmore et al., 2004) Agro-ecological food system studies have focused on material or energy flows rather than interaction among the actors, although the importance of connecting ecological and social systems has been recognised (Francis et al., 2003; Sundqvist et al., 2005).

I agree with earlier critics of food system studies concerning the passive role of consumers (Hindrichs, 2000; Lockie, 2002), the focus on power in the relationship (Murdoch, 2000) and the tendency to assume that local and face-to-face exchange relationships automatically demonstrate the benefits of social embeddedness (Hindrichs, 2000; see also Goodman, 2004). Furthermore, although it emphasises the importance of networks and the ability to network (van der Ploeg et al., 1999; Sylvander and Kristensen, 2004: 101), the alternative food chain approach views the relationships within an organic chain from too narrow an angle. With a few exceptions (see Marsden, 2004), these studies ignore the opportunities that the increased interest in collaborative partnerships between the actors within the food chain may provide (Hingley, 2001; Hingley, 2005a, b).

While food system studies focus on food systems and chains, EM is a broad area of research with various emphases. However, the broad area encompassing the perspectives of many stakeholders is consistent with my aim to approach the organic chain as an entity. The EU-level organic regulation and the international principles of organic production demonstrate the involvement of states and NGOs and pave the way for the collaborative co-creation of sustainable development together with business actors in accordance with ecological modernisation (Mol,

1995; Allen and Kovach, 2000; Nielsen et al., 2009). The involvement of general retailers as drivers of the organic food market suggests opportunities to enhance organic consumption and production and simultaneously achieve the positive ecological and economic benefits without fundamental structural changes in the current food chains (Milanez and Bührs, 2007).

Supply chain management endeavours to increase the competitive advantage for the supply chain as a whole and for its individual members (Lambert et al., 1998) and, until recently, without any special emphasis on sustainability (Carter and Rogers, 2008). SCM is applied to industrialised and globalised food chains. Despite features that suggest a mismatch with the organic chains, SCM offers the knowledge necessary for understanding the operation of the food chains in general and the ways to improve their performance and to achieve the supply to meet the demand, the latter being identified as a central problem with organic chains.

These approaches partly overlap and share some viewpoints. Both SCM and alternative food chains emphasise the role of relationships in constructing value rather than concentrating solely on the product itself. They emphasise the customers as a source of value production and recognise customers as co-creators of value (Wikström et al., 1994). SCM strives to create value by understanding customers' needs and their value creation processes as well as producing this value in a more efficient way (Mentzer et al., 2004; Lambert et al., 1998). In the alternative food chain approach, food accompanied by value-laden information from its origin and production methods matches the value processes of those consumers who are increasingly interested in such dimensions of quality (Marsden et al., 2000). The total value is thereby increased, and consequently, there is more to share among the actors involved in the production.

Food system studies and EM share a concern about harmful ecological impacts, and both aim to reduce these impacts. However, the perspectives differ and even contrast in relation to the role of industry. Alternative food chains distinguish themselves from the industrialised food chains, whereas EM emphasises the roles of industry and modern science as drivers of both ecological and economic benefits. The discussion of the relationship between technology and ecological care has tended to see this difference as a dichotomy. I agree with the view of Fisher and Freudenburg (2001) that 'the reality is likely to be more complex – a matter of degrees, rather than absolutes' (p. 704). Organic chains provide a good example of real life complexity. Given the assumption of this study, namely that organic farming has the potential to generate ecological benefits, increase in organic agricultural area is necessary to realise this potential. In order to transform organic agricultural production into products available to consumers, hybrid organic chains are usually needed, particularity in countries like Finland where long spatial distances are involved. However, hybrid organic chains integrate the industrial and alternative

food chains and involve the following main challenges: the parallel achievement of ecological and economic benefits and the production of value to all actors, including organic farmers. These challenges call for a collaborative approach rather than a dual-natured one.

The need to enhance the environmental awareness emphasised in EM is in accordance with the information flow between producers and consumers in alternative food chains (Allen and Kovach, 2000; Marsden et al., 2000). However, the link between environmental awareness and consumer behaviour is not clear (Kollmus and Agyeman, 2002; Thøgersen, 2009). Milanez and Bührs (2007) emphasise that green consumption also requires producers to be innovative and to provide green products. The ability to innovate benign environmental products and related processes requires companies to allocate resources to this development and commit to extending the environmental strategy to all activities (Kallio, 2001).

Ecological modernisation highlights management systems that tend to expand the boundaries of a single firm and emphasises the linkages between actors (Milanez and Bührs, 2007; Linnanen, 1998) convergent with the integration of processes in SCM. SCM is interested in the relationships between business actors in the food chain whereas EM widens the nature of the relationship and emphasises the parallel actions, consensus and coherent aims of various stakeholders (Marsden, 2004; Milanez and Bührs, 2007; Mol, 1995; Peattie and Crane, 2005; Seager, 2008). While studies of alternative food systems focus on power in the food chain relationships, SCM emphasises the benefits of mutual, collaborative relationships (Mentzer et al., 2001; Min et al., 2008; Simatupang et al., 2002).

Collaboration has been rather rare in food chains, where the sum of the value is often regarded as fixed, leading to the question of how value is divided among the actors. Furthermore, regulated markets isolate farmers from the other actors in the food chain, the variability of yields causes price volatility, and imbalance in size and power among the actors within food chains is a rather frequent finding. (Barratt, 2004; Fearne et al., 2001; Hingley, 2005a,b). However, the special competence valued by the potential partner may open the way for collaboration between actors with size imbalance (Sharma et al., 1997). Although some researchers have claimed that collaborative relationships do not fit with low value-added goods in food chains (Fearne et al., 2001; Palmer and Bejou, 1994), others have suggested it could help to shift the focus from the price of generic food products to added-value features (Glandieres and Sylvander, 1999; Hingley, 2005a, b). In line with the latter view, organic foods – as benign environmental products – valued by consumers may fit the corporate responsibility strategies of the conventional actors and open the way for collaborative relationships among the actors in hybrid chains.

Table 3. The three approaches to interaction among actors in an organic chain.

	Alternative food chain	Ecological modernization	Supply chain management
Main concern	To increase the share captured by farmers from value produced by the food chain	To enhance ecological benefits simultaneously with economic benefits	To increase competitive advantage of the whole chain and its members
The central actors	Farmers, rural actors	Industry and the market actors, governmental and non-governmental actors, other relevant stakeholders	In food chains, especially manufacturers and retailers
The central relationships	Farmers consumers	Relationships with market actors and all relevant stakeholders	Retailers manufactures; Manufactures – suppliers
The role of communication	Connecting the producers and consumers of quality food	Increasing and demonstrating environmental awareness	Coordinating and increasing efficiency and effectiveness of the inter-organizational processes
The role of collaboration	Networking, especially among rural actors	Creating innovations; Creating consensus among the various stakeholders	Increasing efficiency and effectiveness of the inter-organizational processes
The relation to food	Totally food-related	Not particular interest in food	ECR-concept applied in food chain
The relation to ecological benefits	Focus on social, economic and ecological benefits of rural areas	Focus on ecological benefits simultaneously with economic benefits	Focus on economic benefits

All the approaches recognise the interdependency between the actors and emphasise the need for strengthening the relationship, communication and/or collaboration among the actors (Table 3). However, each approach tends to exclude some actors and adopt the perspective of certain other actors and relationships. Furthermore, the main concern varies. To understand the interactions along the whole organic chain, from the farmers to the consumers, these approaches need to be integrated. The following section offers just such an integration by presenting a conceptual framework (which is presented in more detail in Article I).

CONCEPTUAL FRAMEWORK

A system approach provides a useful point of departure for constructing an integrated framework as well as for examining the interaction among the actors. As defined by Spedding (1988: 18) a system is 'a group of interacting components, operating together for a common purpose, capable of reacting as a whole to external stimuli'. This definition shifts the focus from individual actors to the group as a whole. General system theory (Bertalanffy, 1969) complemented with hierarchical categorisation according to the complexity of the systems (Boulding, 1956) was especially intended to provide a joint platform for multidisciplinary research. The concepts of the food system (Francis et al., 2003; Olson and Francis, 1995), SCM (Giannakis and Croom, 2004; Mentzer et al., 2001) as well as EM highlight a systemic, holistic view and consequently, the management systems that tend to expand the boundaries of a single firm (Milanez and Bührs, 2007; Linnanen, 1998). System theories comprise a comprehensive research area, and only one, namely, the theory of an open system, is used here because it is used in SCM (Giannakis and Croom, 2004) and in food system studies (Francis et al., 2003). Furthermore, open system theory has contributed significantly to management and organisation studies (Katz and Kahn, 1978; Scott and Davis, 2007; Morgan, 2006).

Open systems, often called living systems, have a close interaction with their environments. Their receive input from the environment and transform and return it as output guided by their basic principle, that is, survival. The input as well as the output can take many forms physical, intellectual, psychological and social depending on the nature of the system (Katz and Kahn, 1978:23, 27, 40).

The literature emphasises some of the challenges involved in applying open systems. Open systems using a living organism as a metaphor are often regarded as too simplistic or mechanical when applied to social systems. Furthermore, there are difficulties in defining the boundaries of the system and in examining the concepts empirically (Katz and Kahn, 1978; Morgan, 2006:38-49). Nevertheless, as a metaphor, the open social system suits as a framework for depicting the complexity of the organic chains and for integrating the concepts of three approaches with an inherent, open-system perspective.

In the framework each actor within an organic chain is considered an open system. The actors are dependent on the sources for input and for output (Pfeffer and Salancik, 1978). In order to manage these dependencies actors tend to establish linkages and develop long-term, collaborative relationships with their exchange partners. This is a central tenet of SCM as well as of EM. The literature on alternative food chains also recognises interdependence, but restricts it to the relationship between the farmers and the consumers of quality food. In the framework, this tendency is demonstrated by extending the system boundary to

incorporate independent actors as stakeholders into a new, open system, here referred to as the organic chain system.

Freeman (1984:46) defined a stakeholder as 'any group or individual who can affect or is affected by the achievement of a corporation's purpose'. For purposes of the framework, this broad definition is restricted as follows: a stakeholder is any organisation or individual consumer who repeatedly exchanges resources with the organic chain system. Thus, actors from farmers to consumers are obvious stakeholders and are here referred to as primary stakeholders. The other members of the supply chain system are here referred to as secondary stakeholders (Lambert et al., 1998).

Based on the definitions of organic agriculture (FAO/WHO, IFOAM, (EC) No 834/2007:L189/1), of SCM (Lambert et al., 1998; Mentzer et al., 2001) and of alternative food chains (Marsden et al., 2000) as well as the tenets of EM (Milanez and Bührs, 2007), I define the purpose of the organic chain system as follows: to add value for consumers and other stakeholders and to promote the health of agro-ecosystems by producing and consuming organic products. The survival and development of the organic chain system mainly depend on its ability to satisfy the needs of the stakeholders continuously and to receive new stakeholders. Furthermore, survival requires continuous input from the ecosystem. The output is comprised of organic products and information for the social environment and the ecological impact on the ecosystem. Owing to the use of organic methods as a preventative innovation, the output to the ecosystem is assumed to produce ecological benefits. (Figure 2)

To capture the interaction among the stakeholders, the framework distinguishes the following subsystems: a main subsystem, a stakeholder subsystem and a communication subsystem. The processes of producing, processing, distributing, buying and consuming organic food constitute the main subsystem, which integrates the distinct transformation processes of each primary stakeholder. This subsystem generates value for the stakeholders by transforming materials, energy, information and other input from the environment and particularly from the stakeholders to organic food through successive phases. Purchases of the product stimulate new input of resources and a repetition of the transformation and ensure the bidirectional flow of value within the main subsystem.

The stakeholder subsystem refers to the independent actors and their system of steering resource allocation. Each stakeholder sets goals and allocates its resources with the intention of satisfying its needs and behaving according to its values. The output received is then compared to the previously set goals. As long as it meets the goal, the stakeholder continues similar behaviour. If the output falls short of the goal, then the actor attempts to correct the shortfall by changing the transformation within the main subsystem or seeking alternative sources for input in order to

achieve a relatively better fit between the goals and the output. When the actor ceases to exchange resources with the organic chain system, the actor is no longer considered the stakeholder and leaves the system, (for more about the cybernetic control system, see Skyttner, 2001: 69-88; Scott and Davis, 2007:90-93).

The communication subsystem serves two functions. First, it controls and coordinates the main subsystem, and second, it attempts to strengthen the loose structure of the organic chain system characterised by various needs and expectations, manifested in obstacles to commitment and long-term collaboration (Barrat, 2004; Fearne et al., 2001; Hingley, 2005a,b; Simatupang et al., 2002; Wycherley, 2002). Information sharing at the operational level is intended to serve the first function, and communication at a stakeholder level, the second function (Scott and Davis, 2007:92, 201; Lambert et al., 1998; Mentzer et al., 2001; Simatupang et al., 2002; Barrat, 2004). Fluent communication at the stakeholder level can stimulate re-examination of goals and even values. These two functions can be seen as learning loops (Argyris and Schön, 1978). The control function incorporates single loop learning, comparing the feedback or received information to the previously set goal. While single loop learning aims to maintain the stability of the system, double loop learning induces change through re-examination of goals and the needs and values behind them. When this learning aligns the interests of the stakeholders within the organic chain system, it strengthens the structure with the result being a shared understanding, common goals and the integration of cultures. (Scott and Davis, 2007:92, 201; Lambert et al., 1998; Mentzer et al., 2001; Min et al., 2008; Simatupang et al., 2002; Barrat, 2004)

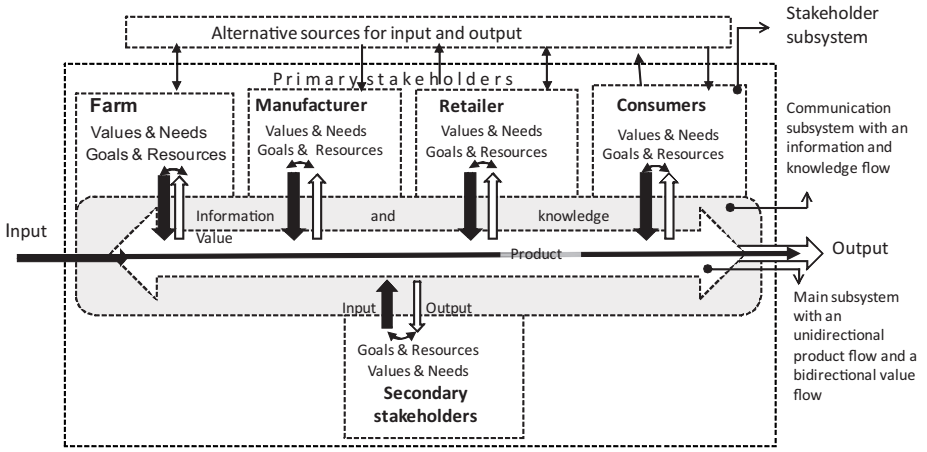

Figure 4. The conceptual framework of the organic chain system as an open system. The organic chain system consists of three subsystems. The main subsystem generates value for the stakeholders by transforming input from the environment and, particularly from the stakeholders, to organic food through successive phases. In addition, the subsystem produces output for the social environment and, owing to the use of organic methods, produces ecological benefits. Each stakeholder operates as a subsystem and allocates its resources to satisfy the needs, follow the values and meet the goals. The stakeholders evaluate whether the main subsystem has produced value for them, and this ensures that economic benefits are created as well. The communication subsystem coordinates and controls the main subsystem and attempts to increase coherence among the stakeholders through information and knowledge sharing.

THE ARTICLES IN RELATION TO THE AIM OF THE RESEARCH

This thesis is based on the author's research published in four articles, all of which examine the same case chains, yet each article approaches the research questions from a different, complementary perspective. Given the multidisciplinary background of the three approaches, no one theory has emerged as the key one. Therefore, I have combined several complementary theories and used them as tools to answer the research questions posed in each article. Below, I present a short summary of each article, its relationship to the conceptual framework and its contribution to the aim of the study.

ARTICLE I: THE COHERENCY AMONG THE ACTORS IN TWO HYBRID ORGANIC CHAINS IN FINLAND

Article I constructs and applies the conceptual framework in real-life situations and focuses especially on the stakeholder subsystems. It addresses the following questions:

1. How coherent are the actors' interests in hybrid organic chains?
2. How compatible are the interests of the actors with the aim of organic agriculture?
3. Does the potential coherence between the interests of the actors and the aim of organic agriculture increase the actors' commitment to the organic chain?

Coherency is defined as the consistency of interests and the alignment of viewpoints. The article assesses the coherency of the stakeholders' values, needs and goals and determines the compatibility of the actors' interests of the actors with the aim of organic agriculture. Furthermore, an effort is made to determine whether this potential compatibility increases the actors' commitment to the organic chain. In line with the theory of an open social system, it is assumed that the coherency among the actors will strengthen the loose structure of social systems (Katz & Kahn, 1978:43) and increase their commitment to the organic chain system. Consequently, the commitment paves the way for collaborative value production and enhances the ecological modernisation of food production.

ARTICLE II: COLLABORATION AND TRUST IN TWO ORGANIC FOOD CHAINS

Article II assesses the nature of the relationship among farmers, manufacturers and retailers to determine the prerequisites for co-production of value. The article focuses on the communication subsystem and assesses the collaboration and trust in the relationships through the amount and the quality of communication.
The following questions are addressed:

1. How do the actors communicate with each other?
2. How collaborative is the communication?
3. Is trust perceived at the chain level as well as in dyadic relationships?

According to Gray (1989), collaboration is 'a process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible'.

Communication is an integral part of every relationship and plays a critical role in the development of exchange relationships as well as in collaboration (Anderson and Narus, 1990; Heide, 1994; Barrat, 2004; Morgan and Hunt, 1994).

Trust is a central dimension of human relationships and is closely related to communication. Persons involved in a trusting relationship share more information and especially knowledge; on the other hand, information-sharing increases trust among communicating partners (Morgan and Hunt, 1994; Weitz and Jap, 1995: Min, 2008). Trust here is used in Wekselberg's (1996:334) definition: 'beliefs that participants of an interaction share common goals and will participate in actions toward these goals'.

The article is about inter-organisational relationships, and the guiding theory is the relational approach to marketing and management (Eiriz and Wilson, 2006; Heide, 1994; Mohrand Nevin., 1990; Morgan and Hunt, 1994).

ARTICLE III: COMMUNICATION BETWEEN ACTORS OF FOOD CHAINS

Article III assesses how well the communication subsystem integrates the primary stakeholders into the chain system. Furthermore, it discusses communication from the perspective of the consumer. The following questions are addressed:

1. What kind of prerequisites do communication practises along the chain provide for market orientation?
2. How do consumers perceive communication between themselves and the other chain actors?

The theoretical concepts used in this article are market orientation (Kohli and Jaworski, 1990; Narver and Slater, 1990) and SCM. Furthermore, the core processes of efficient consumer response (ECR), namely, efficient replenishment, efficient assortment, efficient promotion and efficient product introduction, are used as points of departure to depict inter-organisational processes. (Alvarado and Kotzab, 2001; Finne and Kokkonen, 2005; Hoffman and Mehra, 2000).

ARTICLE IV: KNOWLEDGE SHARING IN ORGANIC SUPPLY CHAINS

Article IV examines the relevant information and knowledge sharing among the primary stakeholders in the organic supply chains by identifying knowledge needs and how knowledge is then shared.

The following questions are addressed:

1. What knowledge does each actor need to conduct its role within the supply chain?
2. What knowledge do the actors share with each other?
3. Where are the bottlenecks in knowledge sharing?

The article is based on the theory of supply chain management (Lambert et al., 1998; Sahin and Robinson, 2002) complemented with concepts elaborated on in the literature about information and knowledge management (Hislop, 2005; Mohr and Sengupta, 2002; Nonaka et al., 2006; Wikström et al., 1994).

Communication, information and knowledge each have multiple definitions arising from different disciplines and epistemic views. I believe that it is not relevant for the purpose of this study to go deeply into those concepts, and therefore I use the following broad meanings: 'Communication' in this thesis means sharing relevant information/ knowledge. The concept of knowledge is used as an umbrella term to cover the following types of knowledge that the actors regard as relevant to their roles in the supply chain, namely, information as a codified, fragment of knowledge; know-how as practise-based knowledge; and understanding that reflects a deeper level of knowledge with explanations and relationships between issues.

RESEARCH METHODOLOGY

RESEARCH DESIGN

I chose a qualitative case study method (Yin, 2003; Eriksson and Kovalainen, 2008; Tesch, 1990), because my purpose was to increase understanding of the interactions within organic chains in a real-life situation, namely, in relationships between persons who interact with each other. Furthermore, the holistic system approach, with organic food as a complex concept and relationships as a sensitive issue, called for a qualitative case study method.

The cases were two organic food chains, selected because they met the requirements for representativeness, comparability and diversity. The chains represented typical Finnish organic chains a small manufacturer processing organic, daily basic food, muesli in one case; yoghurt in the other. With the exception of the organic manufacturers and the farmers, the proportion of organic food in the overall production was small throughout both chains, as is true of Finnish food chains in general. The share of organic products of the total retail sales was about one per cent in the yoghurt category and about two per cent in the muesli category (Nielsen, 2004). Both products were among the leading organic products in their categories. The chains differed with respect to the nature of the product (a fresh product versus a product with a long shelf-life) and each manufacturer's marketing concept (managing the marketing on its own vs. marketing through a big company and under the manufacturer's brand or the retailer's 'Private Label'). The primary stakeholders were identified by following the transformation process within the main subsystem from the point of the organic manufacturer upstream to several farms and down the chain via the retailers all the way to consumers. Figure 5 depicts the primary stakeholders involved in the sequential transformation of the main subsystem in both chains. For reasons of confidentiality, the case companies are kept anonymous, with the exception of the retailers.

In both chains, the manufacturers owned by the organic farmers processed three to five organic products. In the yoghurt chain, the manufacturer is a sub-contractor (hereafter referred to as the Sub-contractor) of a larger dairy company (referred to here as the Brand owner), which processes most of the milk produced in Finland. The Brand owner has supply contracts with the farmers via the regional milk producers' co-operatives, which jointly own the company. Both shareholders and non-shareholders of the Sub-contractor have these supply contracts. The Sub-

contractor processed the yoghurt for the narrow organic segment of the Brand owner, whose role extended from gathering and transporting the milk to developing, selling and finally delivering the products to the stores. In the chain providing organic muesli (the Muesli chain), the organic farmers sold grain to a milling company according to their supply contracts. The milling company served as the main supplier to the Muesli manufacturer, who processed and sold the final products to the retail groups, under its own brand to Retailer S and under a 'Private Label' to Retailer K.

The retail groups S and K represent the two largest grocery retailers in Finland, each having a share of almost 35 per cent (in 2004) of the total market. Retail group S (hereafter Retailer S) consists of regional co-ops, which own the central organisation called SOK (here called central unit S); the retail group K (hereafter retailer K) is comprised of independent retailers and a publicly listed company called Kesko (here called central unit K). The retail groups manage their four foodstore chains primarily through their central units. Both case products were listed in the nation-wide, centrally managed selections of both retailers. The case stores were the supermarket type, located in the Helsinki metropolitan area. The Central unit negotiated the supply contracts and, in the case of the Muesli chain, delivered the product to the stores. The stores' main responsibilities were to maintain the availability of the products and serve those who bought and consumed the products. Consumers were regular customers of a particular store. They used yoghurt and/or muesli as part of their daily diet and reported using organic products regularly or at least occasionally.

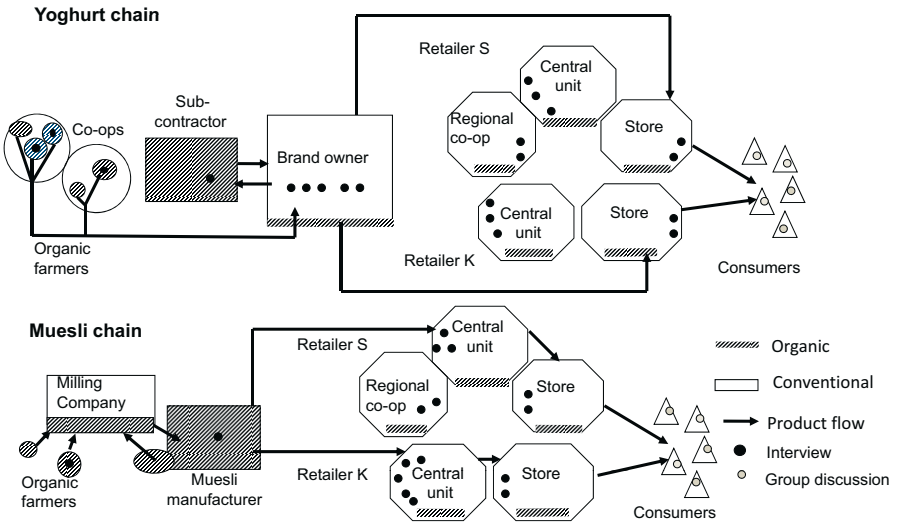

Figure 5. The primary stakeholders in the sequential transformation process within the main subsystems of both organic chains. In the findings, the Central unit of retailer S also includes a regional co-op.

To capture the relevant interaction in the inter-organisational processes of the main subsystem, I chose to follow the core processes of ECR: efficient replenishment, efficient assortment, efficient promotion and efficient product introduction. Because these processes are mainly applied among manufacturers and retailers, the focus was on the following areas instead of on the activities in the process: product flow, organic products among the retailers' selections, communication with consumers, and product development including introduction of novelties. These processes were regarded as those connecting the primary actors and addressing the critical issues identified as problems in organic chains, as discussed in the introduction.

Secondary stakeholders were then identified by analysing the primary stakeholders' sources of knowledge. An information source was classified as a secondary stakeholder when it was mentioned by at least two primary stakeholders. The secondary stakeholders involved organisations operating in research, extension and media, together with the authorities and the organic associations Finfood – Finnish Food Information, the association of Finnish foodstuff enterprises – and Luomu-liitto, the national association of organic farmers (Figure 6).

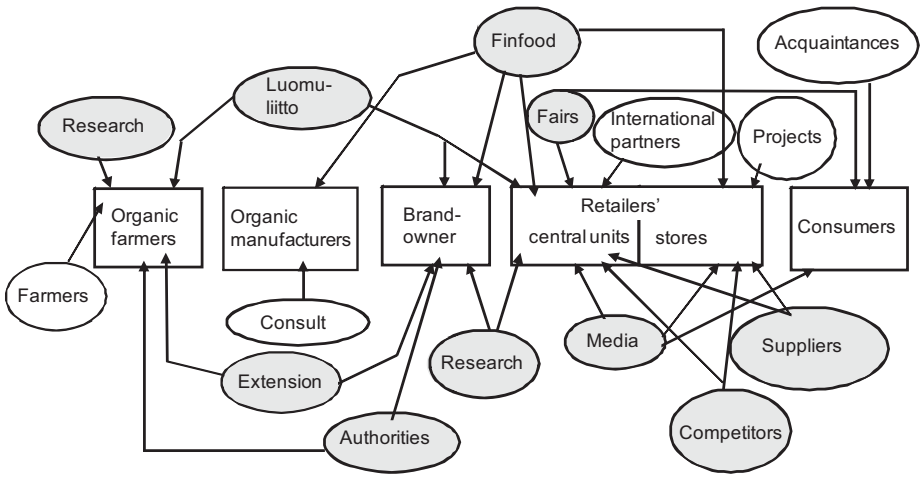

Figure 6. Knowledge sources for the primary stakeholders. The secondary stakeholders in the organic chain system are shown in grey.

'Authorities' here refers to the Ministry of Agriculture and Forestry (hereafter the Ministry) together with the central and regional organisations within the administrative sector of the Ministry, which are responsible for implementing agricultural, food and organic regulations. In addition to organic legislation and control, the Ministry allocated financial resources to the organic farmers in the form of agricultural and agro-environmental subsidies and to the secondary stakeholders, who were carrying

out research and/or extension projects on organic farming (e.g. Luomu-liitto) or delivering information about organic foods (as the organic unit at Finfood does). Because the emphasis in this thesis is on the primary stakeholders, the analysis of secondary stakeholders was restricted to the Ministry. This decision was based on the evaluation of the importance of the Ministry's input to the organic chains.

DATA

The unit of analysis was an organic chain consisting of the primary stakeholders with the exception of Article I, which included the secondary stakeholder as well. The data were gathered through interviews in the organisations and group discussions among consumers. The interviewees were selected according to their responsibilities and their involvement in the processes within the main subsystem and the information/knowledge-sharing within the communication subsystem. In order to determine the interaction on both sides of each relationship among the primary actors, the interviewees included persons who interacted with each other in real-life situations through inter-organisational processes. With the help of two co-researchers, I conducted 27 interviews with the primary stakeholders along the chain, from the farmers to the retailers (Figure 5). A total of 36 persons was interviewed; seven of these interviews included two or three persons simultaneously, such as a farming couple and marketing and information managers in the Central unit. At the stores, both the store and the category managers participated in the interviews. The interviews in the retail stores as well as the four interviews in the Central units covered both organic chains.

The number, the location and the position of the interviewees are shown in Table 4. In the small companies or units, the responsibilities of the interviewees covered the entire gamut of the business; in the larger companies, the responsibilities included category management, marketing or selling the products or the purchase of raw material as well as environmental management in order to cover the interactions within the selected processes. The diversified responsibilities in the bigger companies resulted in the number of interviews being relatively higher downstream than upstream in the chain.

Table 4. The number and location of interviews along the chains and the positions of the interviewees.

Actor in the chain	Number of interviewees		Positions of the interviewees
	Yoghurt chain (Y)	Muesli chain (M)	
Farm	4	2	farmer
Sub-contractor/ Manufacturer	1	1	managing director/entrepreneur
Brand owner	5		managers (key account, marketing, marketing research and procurement)
Retailer, central unit	6 S 3 K	6 S 5 K	managers (category, chain, marketing (own brand), environment and information)
Retailer, individual store	6 S 4 K	6 S 4 K	retailers / store managers, category managers

After analysing the interviews with the primary stakeholder, the researchers supplemented the data with interviews with the secondary stakeholder and consumers. The interviewee in the Ministry was the Permanent Secretary.

Consumers were considered to make up one stakeholder, this being the main reason for choosing focus group discussions as a method for data gathering. In order to ensure the profile of the stakeholder, the researchers recruited consumers for the focus groups by interviewing 85 customers in the four case stores. The criteria for the focus groups were the following: the persons were regular customers of the case stores; the persons had responsibility for their household's food purchases; they used yoghurt and/or muesli as part of their daily diet; and they used organic products regularly or at least occasionally. Furthermore, they needed to be willing and able to participate in the groups. The researchers conducted five focus group discussions with a total of 17 consumers.

The interviews with the primary stakeholders were conducted in the offices of those interviewed between November 2004 and March 2005. In September 2005 the secondary stakeholder was interviewed and group discussions with consumers were held in the meeting rooms of the case stores between November 2005 and February 2006. The interviews and the group discussions lasted one to three hours, and all were recorded and transcribed.

After two test interviews, the themes were reduced to the following topics: (1) the role of the stakeholders in the organic chain, (2) organic products as part of the stakeholder's strategy, (3) the needs, sources and sharing of information/knowledge, (4) the performance of the organic chain and (5) the awareness of the needs of the primary stakeholders. The themes are presented in more detailed in Appendix 1. The preliminary analysis with the interviews of the primary stakeholders (from farmers to stores) revised the themes of group discussions among consumers and the interviews with the secondary stakeholders. The group discussions covered the

following themes: (1) reasons for using organic products, (2) the case products in relation to the expectations of organic products and (3) bidirectional knowledge-sharing among the other primary stakeholders (Appendix 2). The interviews with the Ministry covered the following themes: organic food as part of the government's strategy and activities, the reasons for the government's involvement with organic foods, the perception of future developments in the organic food sector and the potential goals for the development of organic food production.

The themes were quite broad, allowing the discussion to flow in to the directions that the interviewees deemed to be important; the themes could also be discreetly modified to ensure that the interviewees' world was included. I regarded this as necessary because the interviewees represented a wide variety of stakeholders in terms of size and activities as well as in experience and competence. The wide variety of interviewees meant that the relevant themes were varied as well and were dealt with in different degrees during the interviews. This is the main reason for the different lengths of the interviews. In general, the interviewees were willing to participate in the study and openly discussed the themes. However, in the bigger companies, some of the interviewees had difficulty in focusing on organic products, the case products in particular, because these products comprise only a very small part of their responsibility. The aim was to organise one focus group of four to eight consumers among the customers of each case store. However, in each group meeting there were consumers who failed to show up, meaning that the groups remained small, from three to five persons. Nevertheless, the discussions were very lively and all the participants had the chance to express their opinions.

The transcriptions of the interviews were complemented with secondary material such as annual reports, responsibility reports and Internet home pages. This material included very little data about organic products, and therefore, it was mainly used as background information. However, it did serve as the primary source for defining organisational values (Article I).

ANALYSIS

The analysis began with the reading and coding of the interview transcriptions in order to condense and organise the data (Miles and Huberman, 1984). A total of 38 themes emerged from the data, which were reduced to the following ten themes with subthemes: the stakeholders' role within the organic chain system, organic food as part of the strategy, the development of the organic food sector, relationships among the primary stakeholders, information/knowledge, commitment, the performance of the organic chain system, the added value of organic foods, processes and profitability. After coding each interview with the stakeholders, from

the farmers to the retailers, I summarised the individual interviews at the stakeholder level by writing memos, which were then sent to the stakeholders for comments. Very few comments were received; these were mainly corrections of facts about the organisation concerned.

The transcriptions of the group discussions were coded with the help of Nivo-software. The use of free-nodes coding resulted in 33 different themes, which I then summarised as follows: the use of organic products, an evaluation of the case products, the information flow to consumers, the information flow from consumers and the product flow to consumers. I summarised the references in memos. The interview with the Ministry was used as data for analysing the coherency of interest among the stakeholders (Article I), and it was therefore coded according to the stakeholder subsystem of the conceptual framework.

The memos and the coded data served as the sources for the preliminary findings complemented by the annual reports and the Internet home pages as reported in Article I. The analysis varied slightly according to the questions posed in each of the four articles devoted to this subject, but the main principle throughout was to combine the activities and perceptions of the stakeholders to obtain chain-level findings. To achieve that combination, I tabulated the data on the issue of focus, giving each stakeholder its own column. When the preliminary results at the chain level were obtained, I returned to the transcriptions to revise the consistency between the interpretation of the findings and the data. Finally, after equal analysis, the two cases were compared.

The representatives from the primary stakeholders of both case chains (the Muesli and Yoghurt chain separately) participated in a half-day workshop during which the preliminary findings were discussed. The findings under discussion mainly concerned knowledge-sharing in the processes identified. The participants, especially the interviewees, agreed with the main findings, but specified a few points, mainly about the possession of the different types of knowledge (Article IV: Figure 2). The findings presented in the workshop made some practical problems, experienced by one actor, visible at the chain level and therefore served as a forum to deal with the shortcomings identified and to introduce collective learning and shared understanding. All the findings were discussed further among the co-researchers and the co-researcher reviewed the articles.

The logic of the analysis can be regarded as 'pattern matching' (Yin, 2003:116), in which the conceptual framework served as the pattern. An obvious mismatch resulted in the revision of the framework. The data gathering used the emic/actor view, but the ethic/observer view prevailed when combining the stakeholders' views at the chain level, especially when interpreting the findings and comparing them to the conceptual framework (Alroe and Kristensen, 2002).

FINDINGS

Below, I summarise the findings that were presented in more detail in Articles I–IV. The first part focuses on the stakeholder subsystem, and the second, on the communication subsystem of the conceptual framework. Then, the two cases are compared.

COHERENCY AMONG THE STAKEHOLDERS

The values of all the stakeholders indicated coherency by demonstrating responsibility[2]. Among the farmers and the organic manufacturers, the values were closely linked to organic production, whereas among others in the chain, the values were more generic (Article I). Although the values of the Retailers, the Brand owner and the Ministry showed responsibility, including to environmental care, this coherence was not manifested in an increased commitment to organic food chains.

The needs of the organic farmers and the organic manufacturers related directly to the continuity or survival of the actor. The needs of the Brand owner and the Retailers were specific to creating and maintaining the image of a responsible actor (the Brand owner and the Retailers) and to providing alternatives to consumers (the Retailers). The needs of the Ministry were related to potential new markets for farmers and minimising harmful ecological impacts by reducing nutrient leakages. The consumers' needs were related to maintaining good health, enjoying tasty food and taking responsibility for the welfare of the environment and animals. (Article I)

The organic farmers and manufacturers allocated their relatively small resources mainly to the organic chain, whereas only a small portion of the resources of other stakeholders ended up in the organic chain. The received outputs undermined the goals of the Brand owner, the Retailers and the Ministry and therefore could not increase their commitment to the organic chain. This was partially due to poor coherency among the needs, expectations and criteria used for evaluation. The Brand owner and the Retailers used sales as criteria when evaluating received

2 Although responsibility, particularly among the retailers, was undefined, I consider responsibility to mean actions that appear to advance some common good beyond the interests of a single company and what is required by the law (Ness, 1992; Lovio, 2006).

output, although their needs related to image, selection or customer service (Article I).

The consumers and the primary stakeholders who were specialised in organic production related organic products to ecological sustainability, but among the other stakeholders the perceptions of the ecological benefits of organic production and the connection to the responsibility strategies were obscure and divergent (Articles I, IV). Furthermore, the primary stakeholders, from the farmers to the retailers, had no explicitly stated common goal (Article II), nor did they share perceptions about the needs and characteristics of the consumers buying organic products or the potential added value of organic products (Articles III, IV). In addition to incoherency among the primary stakeholders, the findings revealed diverging views on the potential added value of organic products within one stakeholder. This means inconsistent views between the interviewees or between the owners and the managers. (Articles I, IV)

COMMUNICATION AMONG THE PRIMARY STAKEHOLDERS

Communication mainly took place between the manufacturers and the retailers, leaving the ends of the chain largely outside the communication link. The highest level and the widest range of bidirectional communication was found in the replenishment process, which connected primary stakeholders from the farmers to the retailers. (Figure 2 in Article III)

Communication with the consumers was minimal, resulting in poor consumer knowledge about the available organic products. Consumers also had trouble finding organic products among the selection. No one had taken an active role in developing the organic market by strengthening the communication link with consumers. On the other hand, only a few consumers expressed their preferences about the selection to the staff or through feedback boxes; moreover, consumers were quite sceptical of the system of registering purchase details for the purpose of customising the type of communication. However, the national organic label, which the case products carried, created a link between the consumers and the organic producers, especially the farming methods applied. (Article III)

Because of the poor knowledge exchange with consumers, sales information served as the main transmitter of consumers' voices. Despite the opportunities provided by information technology, utilisation of accurate sales information was poor in terms of sharing it among the supply chain actors and analysing the demand for organic products. These aspects further undermined the ability of the sales information to communicate the needs of consumers. (Article IV)

The primary stakeholders needed nineteen different kinds of knowledge to conduct the processes. These nineteen kinds were categorised into five types of critical knowledge: sales knowledge, knowledge coordinating the product flow, consumer knowledge, knowledge about product specifics and knowledge about the potential added value of organic foods. (see Table 1 in Article IV). Only a narrow portion of the knowledge needed was shared. The most fluent categories of critical knowledge were the information coordinating the product flow and the product specifics, whereas knowledge about sales, consumers and the potential added value of organic foods remained largely unshared (Figure 2 in Article IV). However, information about the products available did not reach consumers (Article III). Knowledge about the target group and the potential added value, itself quite controversial, was very scattered, to a large extent embedded in practises and individuals, hence, difficult to share (Article IV).

Despite the fact that most of the knowledge needed remained unshared, the primary stakeholders, apart from the consumers and the farmer in the Muesli chain, were quite satisfied with the knowledge sharing. However, they could identify shortcomings and potential improvements and even find mutual solutions for obtaining chain-level improvement when provided a special forum for communication. (Article IV) Furthermore, a trusting relationship underpinned knowledge sharing and mutual solutions (Article II).

Viewed through communication, collaboration was found only in two dyadic relationships, neither of them at the chain level (Figure 2 in Article II). A collaborative relationship as well as trust existed between a small organic supplier, the Muesli manufacturer, and a large retailer, Retailer S. In particular, a demonstrated competence as an exchange partner seemed to hold the key to a trusting relationship (Article II). The nature of the relationships with the persons interacting rather than the marketing concept (under the manufacturer's brand or the retailer's 'Private Label') played a role in trust, collaboration and knowledge sharing (Articles II, IV). A high frequency of communication was not an indication of collaboration and was less important in the creation of trust than the quality of the communication. The farmers' mistrust of the retailers suggests that some form of communication is necessary for creating trust. (Article II)

COMPARISON OF THE CASES

The findings in the Muesli and Yoghurt chains were quite consistent, both with regard to the coherency among the stakeholders and the communication among the primary stakeholders (Article I, Figure 2 in Article II; Figure 2 in Article III; Figure 2 in Article IV). However, the findings revealed also differences.

Communication integrated the milk-producing farmers more closely into the Yoghurt chain than the grain-producing farmer was integrated into the Muesli chain (Article III). This was mainly because the fresh nature of the product required a regular, constant level of communication throughout the year. Furthermore, the farmer in the Muesli chain expressed dissatisfaction with the knowledge sharing, whereas the farmers in the Yoghurt chain were quite satisfied. (Article IV)

Collaboration was found in both chains in dyadic relationships, but between different stakeholders. In the Yoghurt chain, collaboration was found between the Sub-contractor and its shareholders, whereas in the Muesli chain it was found between the Muesli manufacturer and Retailer S. (Article II) Furthermore, the nature of the product caused some differences in the availability of products and the connection with responsibility. Yoghurt suffered more with the availability problems (Article III). As a product with a long shelf life and no special requirements for shelf place, muesli was a more suitable product with which retailers could demonstrate responsibility (Article I).

DISCUSSION OF THE FINDINGS

The findings indicate that the organic chain system was loosely integrated as a value-producing system. Although the values and needs among the stakeholders demonstrated coherency rather than incoherency, coherency was not evident, either in common goals or in increased commitment. Furthermore, the primary stakeholders had neither shared beliefs about the potential added value of organic foods nor a shared understanding of the needs and characteristics of the consumers of organic products. The highest level and widest range of communication and the smoothest flow of knowledge concerning the product flow clearly demonstrated that the communication subsystem focused on its first task to control and coordinate the main subsystem but largely ignored its second task to strengthen the loose structure of the organic chain system.

Although the integration of the organic chain system was poor, some dyadic relationships demonstrated more successful integration. The collaborative relationship in the Yoghurt chain was based on ownership and shared goals, but the collaboration found between the small organic supplier and the large retailer indicates that the power imbalance is not an insuperable obstacle for a trusting and collaborative relationship between persons interacting in inter-organisational processes (Hingley, 2005a, b). Competence as an exchange partner and time for a personal relationship to develop are important factors in the creation of trust, the former being in line with Wycherley's (2002) findings. Trusting relationships,

collaboration and knowledge sharing co-existed, confirming the interrelatedness of the concepts (Morgan and Hunt, 1994).

Although the focus was on the smooth flow of the product, information about the organic products available in the store did not reach consumers. Improvements in the efficiency of the replenishment process among the retailers and suppliers have obviously shifted the point of inefficiency to the consumers' end of the chain. Hence, the system-level improvements have not carried out. Poor knowledge about the selection as well as the difficulties experienced in finding organic products may further undermine consumers' perceptions of the availability of organic products. Furthermore, the increased time and effort needed to find organic products increase the cost and hence, the probability of pro-environmental behaviour (Diekmann and Preisendoerfer, 1992). These factors are partially responsible for the gap between sales figures and potential demand (Padel and Foster, 2005; Sarkkinen et al., 2006).

The relatively high satisfaction with the limited knowledge-sharing together with competence as an exchange partner as the key to trusting relationships indicate that the actors regarded the chain primarily as a distribution channel for the products. This is a much narrower view of interdependence than is given by the SCM theory (Mentzer et al., 2001; Finne and Kokkonen, 2005; Lambert et al., 1998) or in EM (Milanez and Bührs, 2007, Mol, 1995). However, these findings support previous studies by demonstrating the poor information/knowledge-sharing with a focus on coordinating product flow (Kulp et al., 2004: Mohtadi, 2008) and limited trust as well as collaboration among the actors in food chain (Finne and Kokkonen, 2005; Sporleder and Peterson, 2003; Duffy et al., 2005; Fearne et al., 2001; Hingley, 2005a,b; Wycherley, 2002).

Concentrated communication between the manufacturers and retailers demonstrates their central role in the ECR (Finne and Kokkonen, 2005; Harris et al., 1999; Hoffman and Mehra, 2000; Alvaro and Kotzab, 2001) and portrays the recent development in industrialised food systems (Goodman and DuPuis, 2002; Goodman, 2002; Pretty, 2000; Smith and Marsden, 2004). The minimal communication with consumers indicates poor prerequisites for market and in particular, consumer orientation (Lambert et al., 1998; Kohli and Jaworski, 1990). Furthermore, the results suggest that a chain orientation, that is, a strategic and systemic view of the long-term performance of the chain as a whole (Mentzer et al., 2001), was poorly adapted.

On the other hand, the findings reveal the challenges involved in communicating with consumers and co-creating value, because consumers' motivation varies as does their ability to receive and provide information. Consumers are very interested in ethical aspects of food, and such awareness may well be able to stimulate their involvement and consequently, create conditions that favour consumers' integration

into the collaborative processes of the chain (Bähr et al., 2004; Hoffmann, 2007). Despite poor communication, the organic label created a link between farmers and consumers, as the concept of an extended alternative supply chain suggests (Marsden et al., 2000). However, the poor knowledge about the available organic products created an obstacle to strengthening that relationship.

Among the Brand owner, the retailers and the Ministry, the link between organic products and responsibility was obscure. This may be one reason for the weak linkage identified between generic organisational values endorsing responsibility and the allocation of the resources to the organic chain system among those stakeholders. In addition, sales as the dominant criterion for assessing the output when the needs related to the image, the quality of selection and customer service suggest that the basic need of a firm to secure its resources overrides the generic values of responsibility and the specific needs of organic products. This is in line with the criticisms of EM and the proponents of the alternative food chains (Allen and Kovach, 2000; Burch et al., 2001; Kallio, 2001; Fisher and Freudenburg, 2001). However, the trust between the small organic manufacture and the conventional retailer suggests that competence as an exchange partner can pave the way to EM through hybrid organic chains.

Owing to limited demand, the potential economic benefits of organic products might be especially difficult to obtain in the short term (Bhaskaran et al., 2006). However, the findings indicate that the stakeholders' understanding of the benefits of corporate responsibility activities is obscure, and/or the stakeholders have difficulties in assessing the outputs (Lankoski, 2008a). The findings are in line with those of Maier and Finger (2001), who reported that conventional actors use the criteria based on accumulated experience with conventional products to assess the performance of organic products, despite the different features of these markets. Different dimensions of and criteria for sustainable food further complicate the evaluation of sustainability (Ilbery and Maye, 2005b) as well as the assessment of whether the input to the organic chain system will improve a company's reputation.

Rather than explicit managerial organisational values, a shared belief in organic production embedded in the culture of an organisation (Scott and Davis, 2007:212-214) could be a more suitable concept for applying the framework, especially among stakeholders with a small proportion of organic production. However, the data demonstrated that among the individual employees making up one stakeholder, there were differing perceptions of the nature and ecological benefits of organic farming. This suggests that to obtain a shared belief, there is a need for learning, both within single stakeholders and among different stakeholders (Simatupang et al., 2002).

The industry is acknowledged as an important driver of ecological modernisation (Mol, 1995:40-48). The findings indicate that neither the big company nor the retailers had taken over this place, although retailers with their organic 'private labels' are

the driver in many European countries (Jonas and Rosen, 2005). Furthermore, the Brand owner believed that organic methods did not provide a competitive advantage because the methods are available to all companies (Article IV). The organic farmers and manufacturers, reflecting the basic needs of their companies, had the greatest motivation to contribute to the organic chain, but they lacked the resources to be influential drivers of EM. These results support previous findings, namely that to achieve ecological benefits through EM is a challenging task (Peattie and Crane, 2005; Allen and Kovach, 2000; Marsden, 2004). In addition to consumers' ecological awareness, there is a need for actors to be innovative and to provide organic products to consumers (Milanez and Bührs, 2007; Kallio, 2001) as well as to make the complicated buying process easier for consumers (Lockie et al., 2002; Thøgersen, 2009).

In line with the theory and the evidence of EM (Mol, 1995; Milanez and Bührs, 2007; Peattie and Crane, 2005), this situation emphasises the importance of other stakeholders, such as governmental and non-governmental actors. The involvement of governmental actors has encouraged organic farming and created a regulatory framework for the whole organic chain system. However, the findings here suggest that this is not enough; there is a strong need to motivate the food industry and its retailers to see the ecological dimension of value creation and to develop products and processes that realise this dimension and enhance the EM of food production. These findings also emphasise the need for increased knowledge about the ecological impacts of organic production, shown in previous studies (Sundqvist et al., 2005).

ASSESSMENT OF THE RESEARCH PROCESS

In this section, I discuss the study in relation to the validity of the findings, the reactivity and generalisations as well as the limitations, all of which have to be taken into account when interpreting the results.

The validity of the findings can be improved by describing the logic of the research, by member validation, by triangulation and by combining the views of the actors and the observer (Alroe and Kristensen, 2002; Yin, 2003). The logic of the research process is described in the section on Research methodology. The research process included member validation (i.e. memos to the organisations involved and a workshop in which the preliminary results were discussed) and to some extent, triangulation (i.e. the transcribed data were complemented with reports and Internet home pages, and the findings were discussed in the research group). The data gathering adopted the actors' viewpoint, but in the interpretation

of the findings and the revision of the conceptual framework, the observer's view dominated.

Reactivity refers to the effect of a researcher on the people studied. Because organic food is considered something 'good', it may lead to situations in which people express more positive attitudes about organic food than they actually have in order to give a positive image either of themselves or of their company. Furthermore, inter-organisational relationships and trust are sensitive subjects that can also affect the perceptions expressed. A third source of reactivity is my own background in promoting organic consumption at Finfood. This experience and previous contacts with the interviewees supported a confident atmosphere for the interviews, ensuring open discussions. The potential risk of reactivity refers to the ability of the interviewees and the researcher to distinguish the role of the researcher from that of a promoter. The means to control the risks of reactivity was the study's focus together with various informants and triangulation. The study focused on the stakeholders' roles, needs and goals as well as their communication practises rather than on the interviewees' perceptions and attitudes to organic food and other stakeholders. Furthermore, the interviewees were selected from along the whole chain and from both members of the relationship, and the findings were discussed in the research group. Furthermore, descriptive quotations from the interview transcriptions in the four articles increase the reliability of the findings.

The methodology used in the case studies provides a poor basis for generalising the findings to a wider population (namely, other chains). Yin (2003) has suggested an analytical generalisation: generalising findings to a theory, shown here by revising the conceptual framework in the following section. However, the cases in this research include the largest retailers in Finland as well as two important organic product categories, suggesting that similar findings might be found in other organic chains in Finland. However, more case studies with various types of products and in various countries would increase the understanding of the interaction in organic chains. The data based on two cases serve the purpose of this research: to understand the interaction of the actors along an entire organic chain and to evaluate the consistency of the conceptual framework and the empirical evidence.

The following limitations must be taken into account when interpreting the outcome of the study. I experienced some problems in gathering data, especially with the larger companies. Owing to the small organic share of the total food products, the interviewees sometimes had difficulty distinguishing activities involving organic products from other activities. From the farmers' and organic manufacturers' points of view the study focused on the actor level (the primary stakeholder), but with the Brand owner and the retailers, the study focused on the product level. As a result, the findings do not identify the interaction between the Brand owner and the retailers beyond the interaction with the organic products. Furthermore, the experts

in logistics were not included in the data gathering, although the findings revealed the central role of communication in the smooth flow of the products.

The interviews among the primary stakeholders revealed new stakeholders, which were not originally planned for inclusion in the first phase of data gathering. These included the third farmer in the Yoghurt chain as a non-shareholder of the Sub-contractor, the secondary stakeholder and the milling company in the Muesli chain (Figure 5). Despite several attempts, the research group could not find the interviewee in the milling company, and therefore, the relationships with the milling company were evaluated only unilaterally. Additional interviews in the milling company as well as among the grain farmers might have revealed more differences between the cases and shed further light on the differences with respect to the trust and communication with the farmers in their adjacent actors.

At the outset the plan was to arrange groups of four to eight consumers. However, in each group meeting there were consumers who failed to show up, meaning that the groups remained small. The consumers as users of organic products represented a group eager to receive information as well as to find organic products, and therefore, these individuals do not reflect the views of the average consumer. Nevertheless, I found it important to interview the real users, because they experience the processes studied here in practise.

SYNTHESIS: A THREE-LAYER FRAMEWORK

The findings revealed that the preliminary framework serves more as an ideal model of the organic chain than is found in real life. Although the discrepancy between the ideal and the reality is in line with the critics of EM (Fisher and Freudenburg, 2001), the findings called for a revision of the conceptual framework (Figure 3) in order to describe better the interaction within hybrid organic chains. A narrow view of the organic chain system among the primary stakeholders, a view that is restricted to the product flow, is necessary to import into the framework as the basic form of interaction. Furthermore, the findings revealed that the communication subsystem focused on the task of integrating the processes along the main subsystem; the second task, namely, to increase the coherence among the stakeholders, received little attention. There is, therefore a need to specify the role of the communication subsystem.

The revised framework distinguishes the following three layers of the organic chain system: a product flow system, a chain value system and an ecological value system. The layers differ in terms of their orientation and purpose, the length of evaluation period, the stakeholders involved and the activities conducted. The framework adopts the concept of the supply chain orientation, which Mentzer et al. (2001:11) defined as 'recognition by an organisation of the systemic, strategic implications of the tactical activities involved in managing the various flows in a supply chain'. According to the three layers, the framework distinguishes three orientations: a product flow orientation, a chain value orientation and an ecological value orientation.

The basic layer, the product flow system, adopts a product-flow orientation and aims to transform input into organic products available to consumers This system involves the following primary stakeholders: farmers, a manufacturer and a retailer. Consumers are not considered primary stakeholders, and the organic products are delivered as output to the environment. This system includes secondary stakeholders, such as service providers, other suppliers, the actors responsible for organic regulation and potential subsidies for organic farming. The communication subsystem operates as a cybernetic control subsystem (Scott and Davis, 2007:90-93), focusing on the smooth flow of products, i.e. controlling and coordinating the main subsystem. The primary stakeholders are committed to supply the products according to the contracts and/or orders. The orders are communicated upwards along the chain, and the products are supplied with accompanying information down the chain, finally being placed on the shelves of the retailer and thus made

available to consumers. The sales figures depict the demand for the products and serve as feedback, which adjusts the processing volume and, with a longer delay, the production on the farms. (Figure 7)

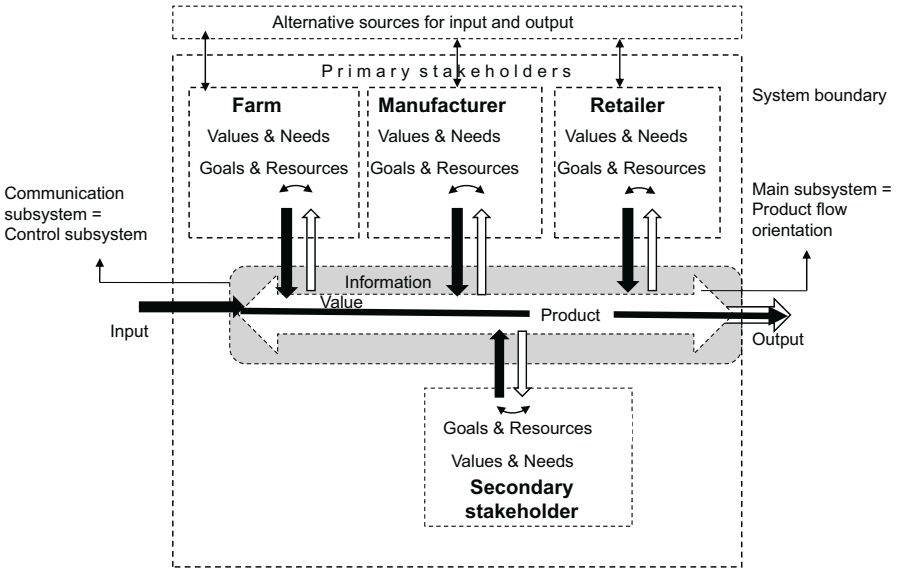

Figure 7. The product flow system as the first layer of the organic chain system. The main subsystem focuses on the transformation of input to organic products as outputs to the environment. The successive purchases of the products stimulate the bidirectional value flow between the stakeholders. The communication subsystem operates as a control subsystem within the bidirectional flow of information and controls the volume and fluency of the product flow.

The second layer incorporates the consumers of organic products as the primary stakeholders in the system (Figure 8). The orientation and the purpose of the system expand from the product flow to increase the value for all the stakeholders. This requires that the stakeholders commit to a collaborative value production. However, in the longer term, the outcome received by the stakeholders must satisfy their needs better than the alternatives outside the system.

To achieve the required commitment and the collaborative value production, communication between the stakeholders needs to extend beyond the actual product flow. Accordingly, the communication subsystem incorporates a new subsystem, a learning subsystem, wherein the stakeholders share knowledge and have an opportunity to learn each others' needs and values and to collaborate to meet these needs. In this framework, learning refers to double-loop learning, while single-loop learning takes place within the control subsystem (Argyris and Schön, 1978). An extended orientation entails new goals and criteria to assess whether the goals

are met, and therefore the control subsystem (single-loop learning) follows the enlargement of the main subsystem. Learning can take place at the stakeholder level, but to achieve a system-wide improvement, collective learning is necessary. Collective learning requires a long-term perspective and an ability to share tacit knowledge and results in coherence among the stakeholders (Simatupang et al., 2002).

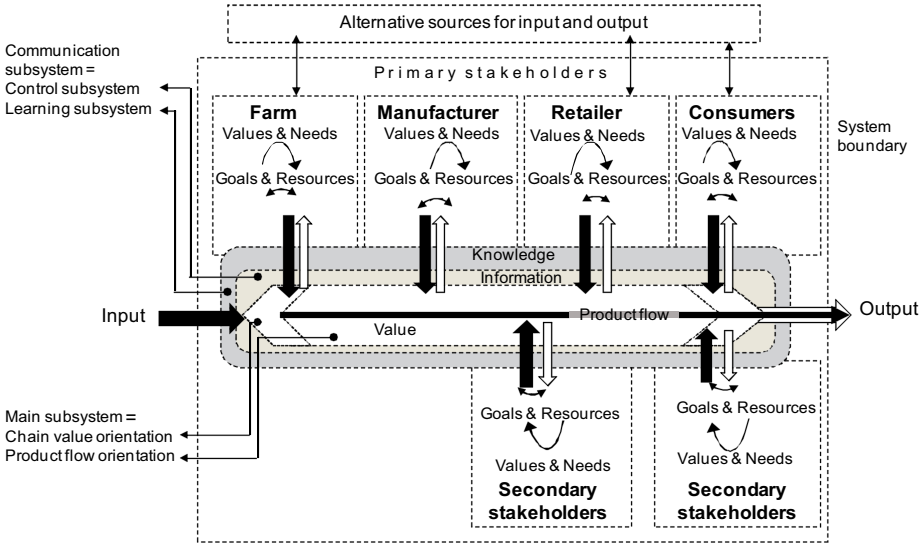

Figure 8. The chain value system as the second layer of the organic chain system. The second layer incorporates new stakeholders, especially consumers. The orientation and purpose of the system are extended to create value for all stakeholders in the longer term. To ensure that the communication subsystem incorporates a new subsystem, a learning subsystem increases understanding of the needs and goals of each stakeholder through knowledge sharing.

When the third layer with ecological value orientation is incorporated into the framework, the revised framework achieves the purpose of the organic chain system in the preliminary framework: to add value for consumers and other stakeholders and to promote the health of agro-ecosystems by producing and consuming organic products. This system operates over the longest term and involves new secondary stakeholders. The visible feedback concerning ecological impacts is greatly delayed and sluggish in relation to the rhythm of the operations in the main subsystem or the decision-making in the stakeholder subsystems. Therefore, there is a need for the secondary stakeholders, which can make the feedback visible to some extent. By introducing political strategies, measurement systems, standards, certifications or regulations, the secondary stakeholders can stimulate the primary stakeholders to set goals for ecological impacts. When these goals and the feedback information are incorporated into a control subsystem, they provide an opportunity to assess whether the needs related to ecological responsibility are met. (Figure 9)

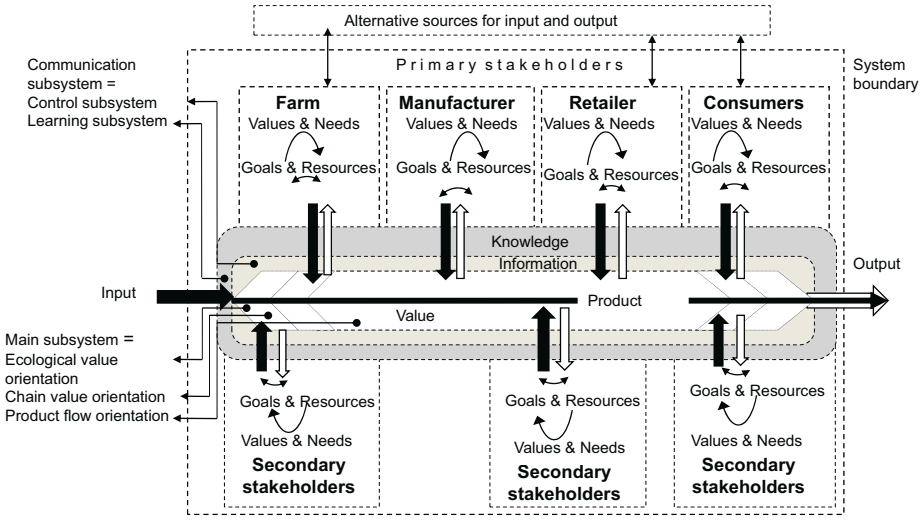

Figure 9. The organic chain system in the revised conceptual framework.

The layers of the organic chain system are interrelated. At the core remains the basic, short-term transformation process, the product flow. The performance of this layer is necessary to achieve the purposes of the other layers. The learning subsystem introduces new goals, which thereafter can be incorporated into the control subsystem to adjust the basic transformation process to meet the new goals that reflect the purposes of the layers with chain value and ecological value orientation.

DISCUSSION OF THE THREE-LAYER FRAMEWORK

The three-layer framework distinguishes the different layers of interaction with diverse orientations and purposes and serves both as an ideal model for hybrid organic food chains and as a demonstration of a situation that is consistent with real-life evidence. By gradually enlarging the chain orientation, the different, but interrelated layers become visible and hence, provide the framework for further research and for drawing practical implications about the performance of organic food chains. All three layers are critical for solving the problems identified in organic chains and for producing economic and ecological benefits by means of organic foods. The interrelatedness of the layers also demonstrates that the aims and outcomes of EM should be viewed as a matter of degree rather than as absolutes (Fisher and Freudenburg, 2001). The revised framework contributes to the models

of SCM (Lambert et al., 1998; Mentzer et al., 2001; Carter and Rogers, 2008) by integrating the pursuit for ecological sustainability into the framework as an essential part of the chain system. Furthermore, a focus on the chain system, i.e. at the product chain level, it complements the conceptual frameworks of food systems (see e.g. Helenius et al., 2007).

The findings suggest that the first layer, the product-flow system, is consistent with the current situation in the case chains (Articles III, IV). The focus is on the smooth and efficient product flow. The consumers are supposed to find the products, and the volume of their purchases indicates consumer satisfaction. In relation to the problems identified in organic chains (Bähr et al., 2004; Padel and Foster, 2005; Sarkkinen et al. 2006; Baecke et al., 2002; Hamm and Gronefeld, 2004), the contribution of the first layer, the product-flow system, is limited. However, it does emphasise the importance of a smooth product flow, which remains a basic layer of the chain system, even with the extended orientation.

The second layer integrates both ends of the chain, namely, farmers and consumers, according to the main tenets of supply chain management (Lambert et al., 1998; Mentzer et al., 2001). It demonstrates an increased interest in promoting communication with the consumers of organic products, as well as the willingness of consumers to participate in the co-production of value (Article III). The product-flow and chain-value orientations are consistent with the two phases of information integration between manufacturers and retailers (Kulp et al., 2004), although they differ with regard to the number of actors involved.

Furthermore, the second layer binds the farmers more tightly to demand-led chains, a loose connection that has been identified as a problem in previous studies (Fearne et al., 2001; Taylor and Fearne, 2006) and demonstrated in Articles III and IV. While the first layer focuses on the current product flow, the second layer involves collaborative long-term visions and planning. By doing this, the layer can play a critical role in balancing supply and demand, one of the main problems in organic chains (Baecke et al., 2002; Franks, 2003; Hamm and Gronefeld, 2004; Sarkkinen et al. 2006). This balance is increasingly important in organic chains, where the conversion period extends the time from farms to consumers.

The central position of the retailers in the current food chains as well as in the case chains provides retailers a number of alternatives to allocate their resources in order to meet their goals, and ensure the value and economic benefits to themselves. When the layer meets its purpose, i.e. to produce value for all stakeholders, it also produces benefits for rural actors, a concern emphasised in the studies of alternative food chains (Goodman, 2002; Murdoch, 2000; Smith and Marsden, 2004). On the other hand, this means that the organic farmers and the small processors are interested in meeting the needs of the retailers as competent suppliers.

Owing to a tendency among the retailers to form collaborative partnerships with a few strategically important suppliers, fewer resources are devoted to the relationships with small suppliers (Article II). However, if the potential partner values the special nature of a product or a specific competence, then the way may be open for collaboration, even between actors with size and resource imbalance. As the findings demonstrate, the organic nature of the products was not the special kind of quality that could ensure a willingness to collaborate and adopt the chain orientation. However, in line with previous studies (Wycherley, 2002), the findings here suggest that a small supplier, regarded as strategically less important, is still able to develop a trusting relationship with a large retailer by being a competent and reliable supplier. Consequently, increase in trust paves the way for knowledge-sharing and the collaborative management of other interdependencies as well (Article II).

In relation to ecological modernisation, the third layer with ecological value orientation is of special importance. However, the interrelated layers demonstrate that the other two layers are also needed to produce parallel ecological and economic benefits. As discussed above, competence as an exchange partner (the first layer) can pave the way for a longer term collaboration (the second layer) and through this collaboration improve the conditions to increase the production and consumption of organic products (the third layer).

In line with Katz and Kahn (1978:43), the framework suggests that coherent values and needs are important for the integration of the system, i.e. to increase stakeholders' commitment to the organic chain, especially when the orientation is extended from the product to the value for the chain or especially to ecological value. The framework suggests that through learning, the coherency among stakeholders may increase and the organic nature of the products evolve to the special kind of competence that could open the way for collaboration and hence, improved conditions for EM. While the chain orientation calls for learning the needs of the other primary stakeholders, the ecological value orientation focuses on increasing the awareness of ecological impacts. Furthermore, learning results in appropriate goals and criteria to assess how well the main subsystem produces chain or ecological value and competence continuously to adjust production in the main subsystem in order to ensure value production and hence, ecological and economic benefits.

The findings indicate that secondary stakeholders have an important role in stimulating learning by providing knowledge, forums for communication and collaborative learning (Article IV) as well as standards and regulations (Peattie and Crane, 2005). The drivers of the organic movement have been farmers and consumers, not industry and science, as highlighted in the theory of EM (Mol, 1995:40-48). Both economic and ecological value production is relatively easy to assess in local, short organic chains (Sundqvist et al., 2005). When the number

of the primary stakeholders increases as well as the distance between them, input from specialised secondary stakeholders may help to make the feedback visible and hence, stimulate learning and coherence among the stakeholders. Although the ecological value orientation emphasises the important role of the secondary stakeholders, it also shows that the primary stakeholders who are specialised in organic production have an important role to play in increasing awareness among their exchange partners. The findings indicate that knowledge concerning ecological value is seldom if ever shared by the primary stakeholders (Article IV).

PRACTICAL RECOMMENDATIONS

The findings suggest that the relative lack of communication between consumers and the other actors in the chain jeopardises consumers' access to organic products. The findings about the consumers suggest the need for better placement, ready availability of selection at stores, either in print or electronically, in-shop product demonstrations as well as proper education of the staff as the means to involve consumers more closely in the chain. Furthermore, when organic perishables cannot be delivered daily, information about the days of delivery as well as a chance to place orders in advance might be worth considering.

Organic products are included in several product categories, yet they account for only a small share of each. This situation calls for inter-category management, but based on these findings, such is not the current practise among retailers. To improve the demand management of organic products, organic products should be managed as a category of its own, based on the target group rather than on the product categories. This could reveal, for example, the lack of organic alternatives in the diet of consumers who favour these products.

Despite the power imbalance, the results encourage small organic suppliers to develop relationships with mainstream retailers by improving their overall competence as exchange partners. However, the findings also reveal the strong need for input from stakeholders other than the primary ones in order to improve the functionality of the organic chain, especially in the chain value- and ecological value-systems. In order to improve the performance of organic chains in relation to benefits for all stakeholders and for the ecosystem, a longer term and chain orientation should be adopted. However, the findings indicate that communication between the actors within the organic chain is strongly focused on short-term activities. Projects that would enhance communication by providing critical knowledge and/or offering special forums for collaborative learning are especially welcome. Furthermore, the findings suggest a horizontal collaboration among the actors specialised in organic production to coordinate better the small and scattered input from organic actors.

This collaboration could evolve to become an influential secondary stakeholder, enhancing the awareness of the available organic products and the connection between ecological benefits and organic production.

In addition to the private actors, the role of governmental actors is important, especially in agriculture. The findings indicate that input from the Finnish Ministry of Agriculture and Forestry encourages organic production, but there is a need to enhance ecological modernisation of food production beyond the farm gate. The motivation of the food industry and retailers to invest more resources to organic foods should be stimulated in various ways. Examples are creating markets by public procurement, increasing research focusing on sustainable food-producing systems and encouraging the food industry and retailers to come up with innovative products as well as production, delivery and communication processes that rest on organic regulation, yet go further in providing a competitive advantage for the actors.

SUGGESTIONS FOR FURTHER RESEARCH

There is a genuine need to develop methods for studying collaboration along the whole food chain. I consider this extremely important in the context of a special segment within a food chain, in which the grounds and the origin of added value are at least partly based on sustainable farming methods and respect for animal welfare. I suggest more research in order to deepen understanding of the interactions and improve the conceptual framework presented here. This study determined the coherency, interaction and collaboration of two organic food chins at a certain time through a cross study and shows the need to increase communication among the actors in order to address the problems identified. To understand whether the shared perceptions and goals are achieved and how the nature of the interaction changes and the commitments and collaborations evolve, longitudinal studies are needed.

Furthermore, data capturing real-life interactions rather than relying on interviews with the actors would shed more light on the interactions. This study suggests a combination of interviews and roundtable discussions. Here, the emphasis was clearly on interviews, owing to the limited previous understanding about the interactions among the actors. In future studies, the emphasis could be vice versa in order to focus more on the learning processes among the stakeholders.

The framework includes various stakeholders, each with different input. It implicitly allows input to the chain to be either positive or negative. Especially where pro-environmental behaviour is concerned, the prevailing culture, attitudes and values of some stakeholders might stimulate negative input that can negate the positive input. In this study, negative input is mainly excluded, but it should receive more attention in the future.

This study is based on evidence from two organic food chains in Finland. Studies comparing the organic chains in various other countries would increase the understanding of the role of organic food chains in enhancing the ecological modernisation of food production.

ACKNOWLEDGEMENTS

I would like to thank the Ministry of Agriculture and Forestry for launching Research Program for Organic Food and Farming in Finland in 2003 as part of which it funded the project 'Interaction between Actors of Organic Demand-Supply Chain', which served as the first step in this thesis. Furthermore, I am grateful to The Finnish Cultural Foundation and the Tiura Foundation for funding this thesis.

I am grateful to my supervisor, Professor Juha Helenius, for welcoming me to my former home institution of Applied Biology as a base for writing this interdisciplinary thesis. Without his patient support and encouragement, especially during the last phases of the writing process, I would not have been able to finalise this thesis. I also like to thank Professor Saara Hyvönen, for professional guidance and good and constructive comments, especially during the writing of the articles related to marketing and supply chain management and the pre-examiners of the thesis, Professors Eva Heiskanen and Niels Heine Kristensen, for their competent work as well as their constructive and encouraging comments.

I want to thank Päivi Rönni for being such an inspiring and supportive colleague over the years and especially during the research. I also want to thank Adeline Maijala, for co-operating with us in the research group and providing us an international perspective.

Numerous others have contributed to this thesis. I am grateful to all the organisations in the case chains and especially to the individual interviewees for their time and the views they shared. I want to mention Professor Niilo Home for valuable discussions in the initial phases of this research, Laura Seppänen; MTT, for helping me to focus my ideas during the first steps of the writing process, and Lena Levander, MMT, for helpful comments during the writing of the article IV. Furthermore, I would like to thank Kaisa Immonen, MMT for the English review of the articles II, III, and the Language Centre of the University of Helsinki for the revising of English the rest of the articles and the thesis.

Finally, I want to thank the people who actually made this thesis possible: my mother, who has always encouraged me to pursue my studies, a privilege she missed in her youth; my father for providing support and teaching me logical thinking. Thanks are also due to my sisters, Tuija, Päivi and Kirsi and their families, and the ladies of Porkkala, Annukka, Anu and Terja, for providing support and understanding during all the ups and downs over the years. Finally and most importantly, I want to thank Kari, for encouraging me to start the doctoral studies and write this thesis and for keeping me closely connected to the food chain, both as a consumer of delicious meals and as a small-scale farmer.

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APPENDIX 1

Themes of the interviews with the primary stakeholders

1. The role of the stakeholders in the organic chain
    - the stakeholder's role in the chain in relation to the processes followed
    - the role of the interviewee in the processes

2. Organic products as part of the stakeholder's strategy
    - the history and development of organic production/ processing/sale
    - the share of organic production/processing/sale
    - the role and importance of organic production and motivations for it
    - future plans concerning organic production/processing/sale
    - the perception of future development of organic foods in general
    - the description of the added value of organic foods

3. The need and sources for knowledge and sharing of knowledge
    - a description of the knowledge network
    - how knowledge is shared and how often
    - what kind of knowledge did the interviewee share (along the processes followed)
    - the need for/lack of relevant knowledge
    - satisfaction with the knowledge sharing along the chain
    - the problems in knowledge sharing along the chain

4. The performance of the organic chain
    - perception of the chain's performance of the chain
    - satisfaction with the chain's performance of the chain
    - the problems experienced and potential solutions common goals and evaluation of the performance

5. The awareness of the needs of the primary stakeholders (concerning organic production/foods)
    - the interviewees' perception of how well
        - they know the needs of consumers and on what grounds
        - they know the needs of other primary stakeholders and on what grounds
        - they know the needs of the other employees or inner stakeholders
        - the other primary stakeholders know the needs of the interviewed stakeholder
    - the interviewees' perception of how well
        - they know the needs of consumers and on what grounds
        - they know the needs of other primary stakeholders and on what grounds
        - they know the needs of the other employees or inner stakeholders
        - the other primary stakeholders know the needs of the interviewed stakeholder

APPENDIX 2

Themes of the group discussions with consumers

1. The reasons for using organic products
    - why do the consumers prefer organic products to conventional?
    - what would make the consumer replace a conventional product with an organic one?
2. The case products in relation to the expectations of organic foods
    - do the products fit consumers' perceptions and expectations of organic products?
    - how should the information on packages be developed to achieve a better fit?
    - how do consumers emphasise the different dimensions of quality (the organic dimension in relation to the other quality dimensions)?
3. The bidirectional knowledge sharing between the other primary stakeholders
    - what are the experiences with buying organic product in the case stores?
    - do the consumers give feedback in the stores? (how and what kind?)
    - do the consumers try to influence product development? Are they willing and able to do so?
    - what information is received from the other primary stakeholders?
    - what are the need for and the lack of information about organic foods from other primary stakeholders?
    - what is the interest in more customised information?
    - what is the role of media, experts, NGOs, etc. in delivering information/knowledge?
    - what are the consumers themselves willing to do in order to increase their knowledge about organic food?